FOR OFFICIAL USE ONLY

No. 1-66/2-66

Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

RELIABILITY OF TEST RESULTS

In a fatal accident which occurred recently, the pilot was reported to have an elevated carboxyhemoglobin level, a positive blood alcohol and an elevated lactic acid. Further studies of samples of the same blood and tissue at another activity were negative for alcohol and carboxyhemoglobin and the lactic acid level was within normal limits. The results of the second laboratory were accepted as being reliable on the basis of techniques utilized, controls and rechecks. In addition, this laboratory conducts large numbers of these particular tests; thus the level of experience is much greater than in the average clinical lab.

This illustration is not intended to cast aspersion on any particular laboratory or individual but simply to point out the necessity for being cautious in accepting results from laboratories whose degree of reliability is unknown. The most reliable aviation toxicology studies are provided by the laboratory at AFIP. For this reason, it is the responsibility of the flight surgeon accident investigator to ensure that appropriate, uncontaminated specimens, properly packaged and labeled, are forwarded to AFIP.

If you are vague on the details of the procedures to follow, refer to FSNL 3-64 or NAVMED P-5065. There is a correction to the instructions in P-5065 -- specimens should be shipped by Air Freight and not air express. As a reminder - don't forget to notify AFIP by phone or message that specimens are being forwarded being sure to give the airline, flight number, time of arrival and airport of arrival in the Washington, D. C. area.

-- CDR WALT GABLE, MC, USN
Aviation Pathologist

#

COMNAVAIRLANT MEDICAL NOTES 1965

The calendar year 1965 has been an eventful one for all of Naval aviation. The onset of carrier combat strikes in Viet Nam has affected not only NAVAIRPAC units, but NAVAIRLANT squadrons, ships and shore activities as well. During the year the Force Medical Officer has had occasion to visit virtually every NAVAIRLANT medical activity -- from the Mediterranean deployed units, to the Caribbean fleet training activities; from Keflavik to Key West. He is proud to state that without exception our Medical Department personnel are

doing a superb job of supporting Naval aviation. A few units have fine new facilities; a few others are working under the handicap of antiquated and/or grossly overcrowded facilities. But the people who man these units are carrying out their missions. And, thanks to those in BUMED and elsewhere who are responsible for staffing, we have had enough personnel, and of the right kind, to do the job, with rare and usually only temporary exceptions. Our flight surgeon billets in particular have been filled at or near 100% virtually all of the time; and filled by hard working, dedicated men -- who continue to reflect the excellent training and motivation they received at Pensacola. Unquestionably they have played a major role in the achievement of the lowest accident rate in any year that COMNAVAIRLANT units have ever experienced -- 1965.

To mention a few of the highlights: USS AMERICA was commissioned in January 1965, went through a long shakedown, training and POM (preparation for overseas movement) period, and deployed to 6th Fleet on 30 November. Bob McDONOUGH is SMO. The Force Medical Officer reported to COMNAVAIRLANT (VADM BOOTH) that, in his opinion, she sailed with the finest medical department afloat.

ENTERPRISE, with Hank TROSTLE replacing Frank AUSTIN as SMO, after a long overhaul and cycle similar to AMERICA, has been transferred to NAVAIRPAC (in place of AMERICA) and is now setting new records in combat in Southeast Asia.

INDEPENDENCE, with Bill DEMPSEY as SMO, was the first NAVAIRLANT carrier deployed to Southeast Asia. She was relieved by ENTERPRISE after covering herself with glory, and returned to Norfolk to receive a Presidential Unit Citation and a well deserved Christmas leave period.

The Mayport based CVA's SARATOGA, F. D. ROOSEVELT, and SHANGRI-LA, along with FORRESTAL, have all had 6th Fleet tours. Their SMO's are Dave MORRIS (now Captain), Jack POTTER, Jim EASTERLING, and Bob RUSSELL.

It is notable that every one of these CVA's have done superb medical jobs. They have not only cared for their own, but in their roles as "hospital ships" have cared for the accompanying "small boys" and many others. The Force Medical Officer's job was made easy by the fact that none of these ships was confronted by problems which they did not handle exceedingly well. The ships' medical officers, wing flight surgeons, MSC officers, and hospital corpsmen formed most effective teams.

Stu RAGLAND, former SMO of FORRESTAL, has returned to civilian life. He misses the Navy, and we miss him.

The CVS's, with one exception, have new SMO's. They have had a busy year also. Each has had an important role to play in the recovery operations of the Gemini program. They, and their SMO's, are: WASP - Jim BROUGH; RANDOLPH - Hal BROSWELL; LAKE CHAMPLAIN - Nick SCHLITZ; ESSEX - Bob MAMMEN (the old timer); and INTREPID - Larry BLACKBURN. Though these ships are older and generally smaller than the CVA's, they too are doing fine medical jobs as they carry out their many ASW tasks. BROUGH on WASP has had a

tuberculosis problem which he is very much on top of in his pursuit of contacts, suspects, and placing of patients under treatment at the earliest possible moment.

For all of these ships improvements have been made equipment-wise by providing them with flame photometers for electrolyte determinations, and defibrillators for possible life saving use in emergencies. For the CVS's their administrative capabilities have been enhanced by re-establishing MSC billets aboard, and filling those billets with capable officers.

FAIRWINGSLANT, with Randy TATE as Staff Medical Officer, has had a fine year. With deployments to Keflavik, Rota, Sigonella, Bermuda, Gtmo, and even to the Pacific, they have long needed more flight surgeons to cover these deployments as well as to provide services to home bases. Now, with three flight surgeons in each Patrol Wing, the situation is much improved with an equitable deployment rotation schedule in effect.

The major COMFAIRS at Quonset, Norfolk, and Jacksonville are ably staffed by the SMO's of the Air Stations on an ADDU basis -- Captains Bob GREENBERG, Bill WRAY, and Dick NAUMAN, respectively. Their Medical Departments, and those for which they have staff responsibilities have functioned most effectively.

While time and space do not permit mention of all of the many other NAVAIRLANT members of the medical team, mention must be made of:

CDR R. T. KIRK, SMO at Argentia -- everything well under control.
LT D. L. MANSFIELD, SMO at Bermuda -- likewise.
CDR B. C. JOHNSON, SMO at Keflavik -- also serving as surgeon, flight surgeon, and staff M. O.
CAPT R. F. SHUGMAN, SMO at Roosevelt Roads -- keeping his people happy.
CAPT L. E. ANTHONY, SMO at Mayport -- ably supporting the fleet.
CDR R. W. MAHEN, SMO at Key West -- laboring under the handicap of an ancient dispensary.
CDR T. W. TURNER, SMO at Oceana -- who has devised a very effective appointment system for patients which has had marked success and resulted in kudos from many.
CAPT R. J. MARTIN, SMO at Brunswick -- who is very happy with his rehabilitated dispensary.
CAPT E. A. ANDERSON, SMO at Sanford -- in his inimitable manner pursuing an "operation boot-strap" improvement program.
CAPT E. P. BLACK, SMO at Lakehurst -- watching over the home port of many of our helicopter "angels."
CAPT C. J. BROWN, SMO at Cecil Field -- adjusting (along with Oceana) to the implementation of the East Coast "base loading" concept.
LTs G.J. SALES & C.G. BELLINGER contending with separate facilities at Leeward Point and "Mainside," yet getting the job done.
Joe KERWIN -- selected as the first medical scientist astronaut.
Paul SCRIMSHAW, MSC, aviation physiologist now at NAS Norfolk with ADDU on NAVAIRLANT staff, and starting a long needed physiological training coordination job.
LT Larry WEBB, MSC, assistant on NAVAIRLANT staff whose boundless energy has helped all of us.

Finally, mention must be made of two programs just getting underway which are aimed at the fatigue problems in the fleet. A COMNAVAIRLANT staff study of fatigue under the chairmanship of the Force Medical has sponsored:

a. A study of flight deck crewmen on carriers by the Fleet Work Study Group, Atlantic, which is aimed at improving the lot of these very hard workers.

b. The extension of the manpower accounting portion of the 3M system (a maintenance management system of accounting and data collection) to an entire VS squadron, with the objective of obtaining the facts of manpower utilization in toto, with the hope that with these facts we will be able to manage our most important asset, men, more effectively -- and thus thru a back-door sort of approach alleviate fatigue.

Submitted by: CAPT C. P. PHOEBUS, MC, USN, Force Medical Officer, Staff, COMNAVAIRLANT

HAPPY NEW YEAR!

#

UNDERWATER FUNCTIONING OF AVIATORS' OXYGEN EQUIPMENT

The following, which will also appear in Personal/Survival Equipment Crossfeed 2-66, was contributed by the U. S. Naval Aerospace Medical Institute:

Pilots and aircrewmen are reminded that their oxygen systems will function underwater. Controlled tests plus innumerable experiences during water landings and subsequent escape from the aircraft have borne this out. Whether one is in a submerged aircraft or busily inflating his flotation gear and raft in a choppy sea after ejection, the advantage of being able to breathe is apparent.

The mask should of course be cinched firmly to the face and in case of diluter-demand regulators, a 100 per cent oxygen setting is mandatory. As the miniature regulator is strictly a 100 per cent oxygen system, there is no setting to be made. Inasmuch as oxygen regulators are sensitive to pressure at their location, the regulator's position determines the inlet pressure of the oxygen to the mask. Ideally, the regulator should be positioned on a line from armpit to armpit. The mask-mounted miniature regulator is correctly positioned but console mounted regulators are not. If the regulator is below the chest, the inlet pressure is positive. Conversely, location above the chest will result in a reduced pressure. A one foot depth separation in water will result in approximately one-half pound per square inch pressure differential. In a submerged cockpit, whether upright or inverted, the correct procedure for proper inlet pressure from a console mounted regulator would be to bend the body toward the regulator in order to equalize the pressure on the chest with that at the regulator.

Have confidence in the equipment, understand its functioning under variable conditions and give it a chance to help you in water survival situations.

#

ENCLOSURE 1

HEALTH HAZARDS IN VIETNAM

The following "pass out" prepared by Dr. Steve TOPE of VP-42 concerning general health conditions in Vietnam was forwarded by CAPT Walter L. GOLDENRATH, MSC, USN, NAS North Island. CAPT GOLDENRATH feels this "man in the street" approach is excellent and that it may be of value to flight surgeons who will be going into the area. (Paragraphs 7 and 8 which discuss venereal disease with specific "hotspots" named are here omitted.)

Revised 25 November 1965

From: Flight Surgeon, VP-42
To: All Hands

Subj: Health Hazards in Vietnam

1. The essentials of living are food, drink, rest and social contacts. After an extensive debrief at the Navy Dispensary, I would like to pass on to you some of the medical problems which are present in Viet Nam. These items can greatly affect your ability to do your job and feel like a human being.

2. The Sanitation Section of the Navy Dispensary (HMC CARLIN, phone number 60042, ext. 129) makes regular rounds to check purification of water in all PERMANENT billeting such as

BOQ's	Brinks	BEQ's	International	Plaza
	Rex		Capitol	Town House
	5 Oceans		Hao Lu	Wailing
	Hong Kong		Hung Dao	Victoria
			Ky Son	Kopler Snack Bar

The wells at Tan Son Nhut and the water tanks in front of the BEQ's with messes.

NOTE: The temporary (or transient) billeting such as the Majestic Hotel is NOT on sanitation's route.

Smell the drinking water provided for the rooms. A distinct chlorine fragrance should be detectable. If it is not, the maid or room boy has drawn tap water rather than chlorinated water. To purify water use three drops of iodine or one halazone tablet per quart and let stand for thirty minutes. If the water is dirty, double the amount of iodine or halazone and allow to stand for one hour.

3. Water for bathing is marked, "NON-POTABLE." DON'T drink water while showering! After you bathe or shower, dry yourself thoroughly with a clean towel and then air dry in the nude for ten to fifteen minutes to diminish the possibility of developing a fungus skin rash. It is recommended that you use a kleenex or toilet paper or Q-tip to dry inside the ears after bathing. A water-alcohol mixture will be available for those of you to use who have

had fungus infections in the past. PREVENTION WILL REDUCE THE POSSIBILITY OF GETTING FUNGUS INFECTIONS (OR BOILS) IN THE CROTCH, ARMPIT, EAR AND SKIN WHICH ARE DIFFICULT TO CURE. Take care to dry between the toes. Use clean socks every day, or if your feet perspire a lot, change socks twice daily. Alternating between two pairs of shoes helps keep feet free of infection.

4. Food is our means of supplying the body needs for calories, vitamins, and minerals. Cooked items are, generally speaking, free of bacteria or parasites. Fruits and vegetables are usually the source of the Vietnamese VaVOOM, the green apple two step or the trots, whichever you prefer. In the good restaurants, the USO and other permanent eating establishments such as the Rex, one can be reasonably safe in eating fruits and vegetables. However, no one can predict the honesty and completeness of the cooks in preparing the food. DO NOT GO OUT OF YOUR WAY TO EAT IN GREASY SPOONS OR FROM THE STREETSIDE FOOD VENDORS. If you have occasion to buy fruits or vegetables from the Exchange or other sources allow them to soak in water to which has been added one teaspoonful of calcium hypochlorite for 30 minutes. After soaking, make fresh purified water and scrub before using.

5. PRECAUTIONS FOR AIRCREWMEN

In the aircraft are usually two (2) one gallon stainless steel thermos jugs. In addition there are extra five (5) gallon water cans which have been cleaned full of water in the line tent. Every available source of water, the cooler the better, should be used, filled and taken with you on the flight. For every four (4) hours of heavy sweating take one (1) salt tablet and two (2) paper cups of water. Drink water a little all the time and do not wait until you develop thirst. Fruit juices and soda pop are fairly tasty even when hot. For food, try to use some imagination in preparing meals. For breakfast something light is preferable, not beefstew and baked beans! Bread and jelly or buns with spread on them or even consommé (hot or cold). For lunch when it is hot, again, do not overdo the heavy meals. Sandwiches should be alternated with cooked meals to provide variety. For the evening meal solid cooked foods are well tolerated: potatoes, beans, meats, and fruit cocktails, canned peaches or pears help make the flights more pleasant. When cleaning the eating utensils, take some of the calcium hypochlorite (one (1) teaspoonful to a quart can of water) and let the silverware soak in the solution for 30 minutes. This procedure should sterilize the utensils adequately. By all means keep a waxed bag in the crapper for someone can easily develop a sudden need to use the thing and cannot be searching around in a dark aircraft for a bag. If you feel sick at your stomach or have been vomiting or having abdominal cramps and/or diarrhea before the flight, you do not have to fly. The entire squadron realizes the problem and another crewman can be obtained. Be sure and tell the Plane Commander as far in advance of the flight as you have warning.

6. Rest is important in preserving one's easy-going attitude. Heat, inadequate sleep, irregular eating habits and frustration with the telephone system. transportation and the Saigon siesta -- all contribute to a mild battle fatigue. Avoid if possible going to bed sweaty for chills and colds will probably follow. If you cannot go to sleep and rest at night, try to catch a catnap during the day. A 15-30 minute snooze will help preserve your sweet disposition...

9. Sickcall will be held daily at the line shack by the corpsman. He has an adequate amount of medication for treatment of colds, upset stomachs, diarrhea or minor injuries. Beyond that you must go to the USAF Dispensary (6250th at Tan Son Nhut) or the Navy Dispensary in town. I realize that we are short of people but there is no sense in exposing other people to your bugs and making us even shorter of people.

10. IMMUNIZATIONS

As all of you know we are required to have certain immunizations for operations in this theater. Malaria, plague, rabies, blackwater fever, dengue fever, and encephalitis are but a few of the many available and prevalent tropical diseases. We do not have vaccines for all of these so we must be sure to protect ourselves against those we can prevent or diminish in intensity. While we are here in Saigon it is most important to keep current on your shots.

a. Hepatitis. Gamma globulin protects you against hepatitis. The shot must be gotten either shortly before entering Southeast Asia mainland or within the first 30 days after arriving. The shots must be taken every 5 months if you stay for that long or if you go and come over that period of time. Since the number of cockroaches in a building is roughly proportional to the number of persons in that building who will get hepatitis, report any abnormally large congregations of cockroaches to Sanitation at the Navy Dispensary. If you have not gotten your gamma globulin shot before your arrival, schedule it at the Navy Dispensary through the corpsman.

b. Plague. Plague immunizations are most essential for plague is in Saigon all the time. It is carried primarily by fleas on rats and other rodents. The shot schedule consists of one initial shot followed by another shot no less than 4 weeks later. Boosters must be repeated at 4 month intervals regardless of the length of your stay or the number of times you leave and return. If you are not current when you leave here, a 3 day quarantine awaits you in Japan.

c. Malaria. Prevention is accomplished by taking one tablet of chloroquine/primaquine combined each week during your stay in Vietnam and for SIX WEEKS AFTER YOU LEAVE THE AREA. While we will make every effort to remind you to take your pills, they are your responsibility both here and in Iwakuni. It is your health, not mine. The disease is difficult to cure completely, the recuperative period is long, and you are never quite the same after you have had malaria. Ask someone who has had it and see what he says.

d. Other immunizations. Polio and other immunizations for completion of a series can be obtained at the Navy Dispensary. Look at your shot card or ask the corpsman or me. It is not the responsibility of the Navy to have someone hold your hand from the moment of service entrance until you depart this mortal existence.

11. PHYSICAL EXAMINATIONS

Every effort should be made to obtain annual, flight or reenlistment physicals in Iwakuni rather than waiting until you get to Saigon. All types of examinations can be performed here. For annual non-flight and reenlistment

physicals, call ahead and report to the Physical Exam Room at the Station Dispensary. Your entire examination can be completed there. For flight personnel a different procedure is necessary. The preliminaries (blood test, urine, chest x-ray, dental examination, audiogram and electrocardiograph when necessary) will be done at the Station Dispensary. HN Friend (60042/43 ext 108) must be contacted prior to your coming. For the eye and aviation physical examinations you must take the results of the preliminary tests, the rough 88 and 3 smooth 88's to the 6250th USAF Dispensary at Tan Son Nhut. Physicals are performed mornings from Tuesday through Friday starting about 0930. I will do the physicals when I am here but the Air Force Flight Surgeons, Drs. Sewell and Dillingham, have agreed to perform them when I am not. These procedures for physical examinations are expected to continue even after the U. S. Army takes over the Station Dispensary and Station Hospital on 1 March 1966.

12. DENTAL EMERGENCIES

For emergencies such as a broken tooth or a filling falling out, go to the Navy Dental Clinic located at 100 Pham Ngu Lao after calling ahead (AD 2132).

13. Animal bites can be the source of rabies. If bitten, try to get a description of the beast, the location (street or house) and GO TO THE STATION DISPENSARY OR STATION HOSPITAL (IF AFTER WORKING HOURS) IMMEDIATELY! The Sanitation people will attempt to recover the animal and determine if it is rabid. If the animal is not found or is recovered and found to be rabid, you will have to have the Pasteur shot treatment. Rabies is a fatal disease. Do not go out of your way to bother any animals, fourlegged or otherwise.

14. For other severe medical emergencies go to the closest facility listed below.

LOCATION	FACILITY/ADDRESS	PHONE NUMBERS
Tan Son Nhut Air Base		
	Army Dispensary Sickcall 0730-1100 Mon-Sun	2868/2879
	6250th USAF Dispensary (Across from the BEMO warehouse) Sickcall 0730-0930/1300-1600	2333 Emergency 2132 Outpatient Clinic 2263 Physical Exam
	Third Field Army Hospital (Outside the main gate at Tan Son Nhut)	30531/25183 Admin ext. 207
In Saigon or Cholon		
	Navy Dispensary (First floor of the Metropole Hotel) 148 TRAN HUNG DAO	
	Navy Station Hospital (Across from the Metropole Hotel) 263 TRAN HUNG DAO	60042/60043

ENCLOSURE 2

AIR CREW SURVIVAL AT SEA - WATER SUPPLY*

Captain Roland A. BOSEE, MSC, USN, Aerospace Crew Equipment Laboratory, Naval Air Engineering Center (NAEC), Philadelphia, Pennsylvania 19112

This presentation is limited to the equipment area of water supply for air crew survival at sea. While water that is currently available in sealed cans (1) is medically preferred for survival purposes, the cube and weight limitations imposed by present aircraft construction prevent its use. Some means of converting sea water to potable water must be utilized. For this purpose, we now use the desalter kits (2) and the solar still kits (3) for our air crew survival water supply. Basically, there has been no significant change in this equipment since World War II. We entered World War II with canned water and solid-fuel sea-water stills and at the conclusion of the war we had the desalting kit and its back-up mate, the inflatable solar still.

Fighter Type Aircraft Survival Kits

To better understand why our survival-water supply equipment has not advanced technologically since World War II, let us first look at the fighter aircraft survival kit.

a. Survival Equipment Offered (4)

In addition to the PK-2 pararaft, we offer a variety of equipment considered essential for use in the fighter aircraft survival kit. The listing is as follows:

(1) Desalter kit
(2) Solar distillation kit[1]
(3) Water storage bag
(4) Survival rations
(5) Dye marker
(6) Signalling mirror
(7) Distress signals
(8) Transceiver radio
(9) Radar corner reflector
(10) SEEK-1, survival, escape and evasion kit
(11) Sponge
(12) Poncho
(13) Sunburn ointment
(14) 50 foot nylon cord

b. Kit Size Limitations (5)

While we offer all these survival aids, including survival water sources, because of cube limitations of the ejection seat, we cannot fit all these aids into every type aircraft survival kit. The ballistic type ejection

---

* Presented at a special meeting of the Advisory Group for Aeronautical Research and Development (AGARD) (sponsored by NATO) at Athens, Greece in July 1963, and reprinted from the USN Medical News Letter, Vol. 42, No. 4

seat set a premium on space and weight available for survival equipment. The survival equipment kit size varies with the particular aircraft but, in general kit dimensions exclusive of the pararaft range from:

15" length x 7-1/2" width x 4-1/2" depth
15" length x 4-1/4" width x 3-1/2" depth

These then are the parameters for the containment of the survival aids in fighter type aircraft.

c. Effects of Field Decisions on Survival Aids (6)

The narrow limits for containment of survival aids in the survival kit make each individual aid competitive, one with the other. Selection of the offered survival equipment is left to the discretion of the type and force commander to meet the particular operating conditions. In the fighter craft area, there is a trend to trade off the sole survival water sources -- the solar still and the desalting kit for locator devices (7) and the SEEK-1 kit (8).[2]

d. The Water Dilemma

We at the Aerospace Crew Equipment Laboratory are in the unhappy position--if you will excuse this--of carrying water on one shoulder and an empty bucket on the other. On one hand, we are trying to develop a small package size solar still that will be more competitive in size than the current pack still and, on the other hand, we have developed the SEEK-1 kit (9), the use of which in the fighter aircraft survival kit may possibly displace the desalting kit. There has been a strongly endorsed proposal (10) to trade off the desalting kit for the SEEK-1 in the Martin-Baker seat survival kit, but we have questioned this and requested a statistical study by the Naval Aviation Safety Center, Norfolk to determine the desirability of the trade-off (11).

Survival Kits for Larger Aircraft

While the survival water supply on fighter type aircraft is tending to dry up, larger aircraft using the multi-place rafts are supplied with desalting kits and solar still on a general ratio of 1 desalter kit and 1 solar still for each raft rated occupant exclusive of the 20-man raft which has a somewhat reduced equipment ratio. The more desirable canned water so widely used by our surface craft is not used on aircraft because of weight and space considerations. Sea water distilling units requiring the use of solid fuel that have been offered for consideration to date have been found unacceptable because of weight, size and hazard from heat and hot distillate. Efforts to develop a reliable sealed plastic container that will yield through irradiation, a bacteriologically sterile and potable water after long-term storage are being pursued by industry, but again, weight and space limitations would preclude the possibility of utlimate application to aircraft.

Recent Developments in Equipment and Procedures

While no new survival water equipment has been adopted, we are doing some work in the water equipment area.

a. Current Design Solar Still

During recent Aerospace Crew Equipment Laboratory sea tests (12), we found that the current use MIL-D-5850 sea water solar stills of from 5 to 12 years shelf age can produce from 1 to 1-1/2 pints of survival water per day in moderately rough to calm seas and sunny skies provided the stills were properly manufactured. We believe that field complaints to the effect that our stills produce a refined brand of sea water are caused by faulty manufacture. We are tightening the inspection requirements on the still at the manufacturing level and are working out a dynamic still operating test for inclusion in the still specification.

b. New Design Solar Still

We are also trying to develop an improved solar sea water distillation kit with greater output of potable water, smaller package size and more simplified construction than the present kit. Our first prototypes did not fare well in a sea test, but we expect better results from improved models which will be constructed this year.

c. Desalting Kits (13)

Past manufacturing improvements in the desalting kit chemical have made it feasible to extend the service life of the desalter kit. In this connection, I would like to call your attention to the recent SPCC Instruction 4440.351A of 17 March 1963 which permits extension of the present 5 year shelf and service life of the desalter kit provided 1% of the overage kits sampled at random by the user on a yearly basis meet the following requirements:

(1) Moisture content of desalting chemical is not more than 5%.
(2) pH of effluent water is not greater than 10.5 after 45 minute treatment with the desalter chemical.
(3) Effluent water is palatable (non-salty).

If these requirements are met, the entire lot of overage kits is considered usable. If the tested kits do not meet these requirements, they are to be replaced with fresh stocks. While this instruction now applies to desalter kits aboard ships, a parallel provision is being prepared for the aircraft area.

Conclusion

The Aerospace Crew Equipment Laboratory will continue to search for new or improved means for converting sea water to portable water that is more competitive to the cubic limits of fighter aircraft survival kits than the current use equipment. While no practical alternative to our present water supply

equipment is imminent, we are directing our efforts to reduce the package size and increase the reliability of the solar still and are studying the possibilities of a smaller size desalting kit especially designed for fighter aircraft survival kits.

REFERENCES

1. MIL-W-15117, Canned Emergency Drinking Water.
2. MIL-D-005531C, Desalter Kits; Sea Water, MK-2.
3. MIL-D-5850C, Distillation Kits, Sea Water, Solar
4. BUWEPS Aviation and Survival Equipment Bulletin No. 32-57.
5. A Feasibility Study Concerning Survival/Flotation and Locator System for NPF, El Centro, California by Matrix Corporation under Contract N123 (246)25920A.
6. Same as reference 4.
7. Proposed bulletin by El Centro for Inclusion of PRC/49 Transceiver in Scott Survival Kit of F4H Aircraft.
8. CO VF-84 letter ser 375 of 19 October 1962.
9. BUWEPS Experimental Specification XRAAE-17 of 30 December 1960 for Survival, Escape and Evasion Kit, Individual Airman's, Type SEEK-1.
10. Fourth End on CO VF-84 letter ser 375 of 19 October 1962 from Commander, Naval Aviation Safety Center.
11. Fifth End on CO VF-84 letter ser 375 of 19 October 1962 from CO, NAEC XG-36:JJM:aea 10470(1) (4630) of 22 April 1963.
12. Formal Report NAEC-ACEL-500, Solar Stills for Air Crew Survival Water Supply of 7 June 1963.
13. SPCC Instruction 4440.351A of 12 March 1963 and CO, NAEC letter XG-36:JJM:aea 10470(16) (4685) of 21 May 1963 to COMSERVLANT.

#

Editor's Notes:

[1]Since this presentation the requirement for the solar still in fighter aircraft has been deleted.

[2]The solar still has been traded off and the sole survival water source is the desalting kit. The decision to do this was prompted by the need for locator devices and the SEEK-1 kit.

[3]For a description of a simple solar still for use on land, see FSNL 9-65, Enclosure 1.

Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center).

GLUE JAG

A MAG-14 pilot had a rather unusual experience that CAPT J. M. KRETSINGER, USMC, sent in to be passed on.

"This pilot filed and departed on an IFR round robin. Climbing past 10,000 ft his eyes started watering and stinging. His climb continued leveling off at FL 310 (18,000 cabin). He noticed that he was making mistakes but seemed unable to determine just how to correct them. He became slightly confused and disoriented. After personal efforts to improve his performance had failed, the pilot requested and got a lower altitude, FL 240. After arriving over Cherry Point VFR, he cancelled his instruments and after determining that his performance had improved made an uneventful landing. Throughout this flight the only abnormal feeling noticed by the pilot was being tired.

"Investigation revealed, not a contaminated oxygen system, but the mask seal was the culprit. The mask had been cleaned, inspected, and the seal replaced six days before this flight. A general purpose type III adhesive had been used. After six days of drying this compound still gave off toxic fumes and, in this case, enough to give this pilot a mild jag. Aftereffects also reflected considerable absorption of these toxic fumes.

"I recommend that all units double check for use of this and other types of unauthorized glue on masks. The technician involved was out of the prescribed adhesive, a type II glue, and figured a type III given a 24-hour drying period would suffice. NAVWEPS 03-50B-503, Overhaul Instructions, Pressure Breathing Oxygen Mask, requires an adhesive Mil-A-5092A(AER) type II rubber synthetic (FSN 9Z-8040-664-4318)."

#

INSTURCTIONS FOR THE USE OF CERTAIN DRUGS INCLUDED IN SURVIVAL KITS

The following material was contributed by LT Randy TATE, MC, USN. He reports he has this printed on a 4"x5" card which the paraloft places in the kits. This action, he says, was prompted after 4/5 of his aviators told him D-amphetamine sulfate tablets are for water purification.

1. In the PSK-1, PSK-2, and SEEK-1 survival kits there are a number of medications which are listed by their generic names. There are directions in the kit for use of these drugs but little information on the indications for when to use them. The following is an attempt to aid you in deciding when to employ these drugs in a survival situation.

2. Dextro-amphetamine Sulfate Tablets, 5mg: (Dexedrine) or D-Methamphetamine Hydrochloride in SEEK-1 (Methedrine). Either of the above drugs is commonly misused by truck drivers to keep awake and teenagers seeking "kicks." It is also a constituent of many "diet pills." It is a central psychomotor stimulant which will increase your alertness and reduce fatigue. It has an effect of about 10 to 12 hours. Unfortunately, when it wears off it tends to leave the individual extremely fatigued, which is why it is so dangerous for truck drivers (or aviators). It is also habit forming. In a survival situation it would be indicated in situations where wakefulness and alertness are paramount to rescue. Examples might be in Arctic survival situations where falling asleep and letting a fire go out could mean freezing to death or in a sea situation where signals to a rescue aircraft would be the only true means of discovery and rescue. It will enable a man to stay awake and alert much longer than normally. It must be remembered that it does have its limitations in time, however, and the eventual fatigue which results is overwhelming. It should also be taken only as directed, as overdosage results in many untoward side effects of which circulatory collapse and death is not rare. This is without doubt the most dangerous drug in the kits. Further, do not take kits home where your children could get them as this drug is extremely toxic to them and could quickly cause death.

3. Oxytetracycline Tablets. This is an antibiotic for the treatment of infections. Specifically use this for severe colds, belly cramps with vomiting and diarrhea, suspected pneumonia and infected wounds. If you have a wound which you suspect has been caused by a dirty object, it makes good sense to start taking this drug immeidately to prevent infection. This is particularly true of bullet or shrapnel wounds and wounds exposed to sea water. Again, unless you are in a survival situation, don't experiment with this drug. If you need it, the flight surgeon will dispense it to you. This drug is also dangerous for children.

4. Bacitracin Ophthalmic Ointment. (Boric Acid Ointment in SEEK-1). To be used for eye infections and flash or actual burns to the eyes. With burns also patch and bandage the injured eye shut. Do not try to wash out a burned eye with non-sterile water.

5. Chloroquine and Primaquine Phosphate Tablets. (Only in PSK). These drugs are for the prevention and control of malaria. Take as directed in tropical and semi-tropical areas. Upon rescue inform the medical personnel you have been taking it as you must be continued on it for 6 weeks once you are removed from the epidemic area. Do not be alarmed if you get an upset stomach or diarrhea from this drug. It will subside rapidly.

6. Benzalkonium Chloride Tincture. This is a skin disinfectant to be used just as you use iodine and merthiolate. Do not apply to large gaping wounds. This should be used on all scratches, skin abrasions and small cuts no matter how minor, particularly in sea and jungle situations. Small nicks can become horrible infections with blood poisoning if not cared for in these situations.

7. Petrolatum and Bandages. (Only in PSK). Apply the petrolatum ointment to burns. It will soothe and protect the injured areas. Again, do not cleanse a burn with sea water or water you haven't boiled or purified first. You have soaped tissues in your kits which are designed to wash out burns and other wounds but be gentle and do not overdo it. When applying bandages try to keep fingers away from the surface you are covering.

#

OCCUPATIONAL HEALTH HAZARDS

These items are from BuMed's Occupational Health Hazards Release No. 42.

Mercury - A complete survey was made of all operations in the shipyard using mercury. A room used for distillation and reclaiming mercury was found to have considerable mercury contamination in open beakers and flasks, on tables and bench tops, and on the floor. Atmospheric concentrations of mercury vapor of .03 to .05 milligram per cubic meter were found in the work bench area, .1 milligram per cubic meter in the corners of the floor, .5 milligram per cubic meter in a covered disposal container. A urine specimen from the operator was found to contain .044 mg per liter of urine. Ventilation is provided by an open window and the operator does not remain in the room for extended periods of time. It was recommended that this room be cleaned up, followed by periodic maintenance. A drain should be installed in the work table top so that spilled mercury can be collected. Mercury should not be left standing in open beakers and flasks, but stored in plastic bottles.

No detectable amounts of mercury vapor were found in the gyro shop because of their good handling practices and the ventilation furnished. A urine specimen from the mercury handler in this area contained .032 mg per liter. A meter test area showed mercury vapor concentrations over work benches from .01 to .04 milligram per cubic meter. Only a trace was found on the floor.

Nearby, an incoming box of material contained large amounts of spilled mercury, some of which had run from the box onto the floor. Considerable mercury was found in pools under the pallets and in the cracks of the floor. Mercury vapor concentrations were 0.1 to 0.2 milligram per cubic meter. Work was initiated at once to clean the area. A urine specimen from an exposed person was found to contain .044 mg per liter. A check several weeks later showed no indication of mercury on the floor and the contaminated equipment had been removed.

A previously reported survey indicated that disassembly of gyro compasses in the salvage area produced considerable mercury contamination. A later check indicated that proper cleanup had not been initiated. It was emphasized that this was needed and a check two weeks later showed that the area had been cleaned and no further contamination existed.

All other areas checked were negative for mercury vapor contamination. It is proposed that these operations be surveyed at least yearly. A mercury recovery apparatus has been assembled by the industrial hygiene division and is available to shops who might have spills.

Methyl Bromide - A number of box springs, pillows, and mattresses were to be fumigated prior to a disposal sale. Methyl bromide was used as the fumigant in a sealed building. At the end of the fumigating period, the building was opened for ventilation and forced draft ventilation was used in addition to the natural air circulation. No one was allowed to enter until the following day when the industrial hygiene division made atmospheric measurements and determined that the methyl bromide had completely dissipated. Several other jobs of this type have occurred since and there have been no untoward incidents.

Recommendations for Use of Epoxy Resins - The various sections of the U. S. Naval Applied Science Laboratory which are engaged in work requiring the use of epoxy resin systems were visited... The purpose of the investigation was to determine the types of resins and hardeners being used and to what extent further precautions might be necessary. Methods of use and handling were observed. Housekeeping, available exhaust ventilation and provision of washing facilities were noted. There were four areas in which epoxy resins are handled in the uncured and cured states. These are high strength plastics, dielectrics, plastics and elastomers and coatings. Summary of recommendations made was as follows:

a. Provide local exhaust for curing ovens and mixing of resins. Cleaning of tools and molds with solvents should also be done under local exhaust system.

b. Alter canopy hood in mixing room to provide greater efficiency in exhausting vapors from mixing operation.

c. Extend exhaust on all vacuum pumps used to evacuate samples to the outdoors.

d. Provide disposable plastic gloves at all mixing areas.

e. Provide proper type of barrier cream and skin cleaners.

Xylol - A laborer complained of nausea after wiping stains from surfaces in a small compartment (less than 300 cubic feet) aboard ship. He was using xylol. About one pint had been used from the beginning of the shift until six hours later when the employee complained of being ill. No exhaust ventilation was in use and an air jet placed near the door afforded no dilution at the work area. Tests under simulated conditions showed that the xylene concentration exceeded the threshold limit value and was sufficient to cause illness. It was recommended that a less toxic and less flammable solvent such as dry cleaning solvent, or a water soluble cleaning agent, should be used unless special approval has been issued. Mechanical exhaust ventilation and/or respiratory equipment should be used whenever solvents are used in closed or confined spaces as aboard ship. All containers must be labeled with the military standard warning label to show toxic-flammable properties.

#

SHIPBOARD MEDICINE AND THE FLIGHT SURGEON

Because most Naval Aviators will eventually pull duty aboard ship, a Flight Surgeon should take an interest in shipboard cleanliness, sanitation and general safety. There is no "U. S. Public Health Service" aboard our ships. The MK I Medical Department "aboard" is it, and the Flight Surgeon on a carrier is an important member of that Medical Department.

During the past six months on a WESTPAC Cruise aboard the carrier HORNET, I have visited several carriers, destroyers, oilers and reefer ships. In every case there was a notable lack of cleanliness if one looked around. May I mention a few areas where a medical officer could, by taking the time to notice and properly suggest corrective action, produce some improvement:

a. Showers. Usually dirty with an absence of shower curtains or soap dishes, in need of a paint job.

b. Berthing Spaces. Provision of a laundry bag to all hands will help make them presentable; tightening loose bunk bottoms should give a sailor better sleep and comfort. Provide on-off switches in overhead lighting for convenience of sailors who live in total inconvenience; suggest providing a radio speaker (that works), so crew may get some news and music once in a while.

c. Working Spaces. Require clean coffee mess areas with separate, privately owned cups on a wall board; require that coffee cups be put through ship's dishwasher twice weekly; suggest use of hot soup, bouillion, or cocoa drinks instead of traditional coffee, which has little or no energy, giving calories without some additive. Suggest the use of "Mickey Mouse" noise attenuator ear muffs, for use in high noise level areas. All "snipes" will object that "we must hear engines." Have key personnel alternate wearing noise attenuation gear at half-hourly intervals, and let less responsible personnel wear them continuously, since all engine rooms exceed 110 decibels, which will produce permanent impairment of anyone's auditory acuity, and is against BUMED instructions.

d. Junior Officer's Bunkrooms. Usually terrible to behold; suggest individual light switches on all lights, more locker space, use of laundry bags, provide a radio for news and music where possible; this may encourage more officers to remain in service.

e. Passageways. The Medical Officer should note dark areas during "red light" periods and suggest provision of suitable red lighting, especially near open hatches and ladders; suggest safety chains, two staunchions per upright hatch, with all safety pins in place; suggest padding of all protruding overhead or bulkhead projections, to prevent head, eye or other injuries.

f. Messing Areas. Suggest provision of low-calorie table at all meals, in all messes; suggest reduced Mess Bill for officers on diet if some provision or method of supervision can be arranged. This is presently being tried aboard HORNET with some success.

Time aboard ship hangs heavy on a Medical Officer at times; but by getting to know his ship and trying to make life less miserable than it manifestly already is aboard any ship, a Medical Officer can really get involved in his ship. CAUTION: always make suggestions in writing to the Executive Officer via the Senior Medical Officer after discussing the details with affected parties.

Safety, comfort, cleanliness and sanitation are responsibilities of the Medical Department aboard all ships. Corpsmen can't do "everything" outside of Sick Bay. Where the Medical Officers take an interest, aren't afraid of "making waves," use their influence to further safety, sanitation and cleanliness, all around you have that rare bird "a clean Ship." No one notices dirt and safety hazards as well as an interested M. D. If Medical Officers aboard do not notice and suggest improvements, in general no one aboard will care either.

All Flight Surgeons, who are usually in the majority aboard carrier Medical Departments, cannot restrict their interest to squadron and Sick Bay duties but since there is no one so suitable as an M. D. to notice dirt and hazards you must spread your talent around a little. You'll soon be back home and there's no point in having a "see no evil, hear no evil, speak no evil" attitude for the entire length of a cruise. Moaning and groaning about the inadequacies of shipboard life is useless. Move around, don't be afraid to suggest improvements just because the X. O. or C. O. won't like it. You'll be surprised at their response, at times.

M. J. DUNNE, LCDR, MC, USN
Medical Officer
USS HORNET (CVS-12)

ENCLOSURE 1

INFORMATION FOR FLIGHT SURGEONS INVOLVED IN AIRCRAFT ACCIDENT INVESTIGATION

Compiled by

WALTER D. GABLE, CDR, MC, USN
AVIATION PATHOLOGIST
U. S. NAVAL AVIATION SAFETY CENTER
AERO-MEDICAL DEPARTMENT

Enclosure 1
to FSNL 3-66

INFORMATION FOR FLIGHT SURGEONS INVOLVED IN AIRCRAFT ACCIDENT INVESTIGATION

1. Frozen Tissue

Frozen techniques are used for the preparation of sections for immediate diagnosis, certain histochemical procedures and materials requiring toxicological studies. Toxicological examinations are performed at the Armed Forces Institute of Pathology only in cases of aircraft accidents. Prompt collection of fresh tissue is essential, in order to protect it against chemical or mechanical change. Chemical preservations invalidate results of toxicological analysis; therefore, no fixing fluid (formalin) should ever be used, and formalin-fixed tissue should never be packed in the same container with frozen material. Refrigeration (dry ice) is the prescribed method of preservation, and rapid transportation is of the utmost importance.

2. Toxic Agents

In completing gross autopsy protocol (DD Form 1322), when toxicological studies are requested, it is important to indicate any suspected intoxicants or drugs. Every medical officer investigating an aircraft accident must be alert to the possible presence of toxic agents associated with aircraft as well as those not so associated.

3. Preparation and Packing of Specimens

Tissue specimens for toxicological examination will be collected under the supervision of the pathologist performing the autopsy and will consist, whenever possible, of the following: liver, brain, kidney, lung, bone marrow, blood, urine, and stomach contents. Precautions should be taken to prevant contamination of the specimen during the course of the autopsy. Thorough toxicological examination requires approximately 250 to 500 grams of brain, liver, kidney, and lung, 50 ml of blood, and all urine available. The amount of tissue available will govern the amounts submitted. Red bone marrow and lung tissue are especially useful in such cases where disintegration of the soft tissue has occurred.

a. Individual tissue specimens, that is brain, liver, etc., should be placed in separate plastic bags. In view of the quantity of material required, it may be necessary to distribute the individual specimens between several latex rubber or plastic bags.

b. Blood and body fluids will be shipped in latex rubber bags. The air should be carefully evacuated prior to closing the bag by knotting or other means. As an added precaution, this type bag should be enclosed in a second bag.

c. It is recommended that heavy polyethylene plastic bags (.005 or .006 gauge) or latex rubber bags (condoms) be used as individual specimen containers. The specimen should be placed in the plastic or rubber bag, as much air as possible evacuated from the bag, and the bag then heatsealed, knotted, or securely fastened with a rubber band. As an added precaution, the tissue should be enclosed in a second bag

in which a tag with all identifying data should be placed. It is recommended that a paper label only be used in identifying frozen specimens, as plastic labels may cause camphor odors to permeate the specimens and give false determinations. Heat-seal or fasten the second bag, as indicated above, and prepare for shipment. DD Forms 1322 (Aircraft Accident Autopsy Report), 1323 (Toxicological Examination - Request and Report), and any other available information should be sealed in a separate plastic bag and forwarded along with the specimen.

d. It is imperative that frozen specimens and dry ice not be packed in sealed cans or any type of container which will not permit the escaping gas to pass through its walls. Dry ice is formed under tremendous pressure; it requires approximately 230,000 cc of carbon dioxide under pressure to form one pound of dry ice. The pressure created inside a sealed container presents a great potential hazard, as it could cause the container to burst. Do not enclose dry ice in a thermos bottle unless holes are drilled through the stopper of the thermos.

e. When packing for shipment, the specimen and protocols (DD Forms 1322 and 1323) should be placed in a stout cardboard box filled with pieces of dry ice and enough filler (sawdust, styrofoam, etc.) to fill and insulate the box. The box should be large enough to hold eight to ten pounds of dry ice for a shipping time of 24 to 36 hours, and should be sealed with tape, then wrapped in several layers of heavy paper. A plastic-insulated box is available on the Federal Supply Schedule; its nomenclature is "Box, Plastic, Insulated; Meat, Dairy Products, and Laboratory Samples."

4. Addressing

The packing box containing specimens for toxicological examination should be labeled "FRAGILE - RUSH - SPECIMENS FOR TOXICOLOGICAL EXAMINATION (AIRCRAFT ACCIDENT)," and forwarded by military or commercial AIR FREIGHT to the Director, Armed Forces Institute of Pathology, Washington, D. C. Correct designation should be clearly written to insure prompt delivery. Send TWX notifying AFIP of 1) time of arrival, 2) airline, 3) flight number and airport. Also put telephone number (RA3-1000, extension 2800) at AFIP on outside of package and ask carrier to call when material arrives. Mark "Frozen Tissue" on package, as well as the above "Fragile, etc."

NOTE: Dry ice should not be handled without the use of gloves, should not be placed in glass or other completely "closed" containers. Do not enter poorly ventilated areas where large quantities of dry ice are stored.

TIME TABLE FOR FROZEN SPECIMENS: A suggested table has been prepared for guidance of personnel in preparing fresh tissue specimens being shipped for use in toxicological studies. This table gives the estimates for outside temperature and the number of hours in transit. This will assure that sufficient dry ice will be used to protect the specimen until its arrival at the final destination.

Outside Temperature	No. Hours in Transit	Weight of Specimen	Minimum Amount of Dry Ice Add More When Possible
Below 50 Degrees F.	72	2 lbs.	5 lbs.
	48	3 lbs.	4 lbs.
	24	4 lbs.	3 lbs.
50 - 80 Degrees F.	72	2 lbs.	5 lbs.
	48	3 lbs.	4 lbs.
	24	3 lbs.	4 lbs.
80 - 100 Degrees F.	72	1 lb.	6 lbs.
	48	2 lbs.	5 lbs.
	24	3 lbs.	4 lbs.
Over 100 Degrees F.	(Not recommended for shipments requiring more than 24 hours)		
	48	1 lb.	6 lbs.
	24	2 lbs.	5 lbs.

5. Movement of Remains

Educate crash crew and other personnel not to move remains unless there is an absolute necessity for such action. Also do not proceed without permission from cognizant authority (i.e., medical examiner, coroner, or other designated official).

6. Photographs

Secure adequate photographic documentation.

7. Personal Equipment

Do not prematurely release or destroy personal equipment.

8. Phone Numbers

Do not hesitate to ask for assistance. Useful phone numbers are:

a. NAVAVNSAFECEN - 444-3321 (After working hours, holidays, and weekends - 444-3520)
b. AFIP - RA3-1000, ext. 2991

9. References

Useful references:

a. Autopsy Manual - NAVMED P-5065
b. BUMED INST 6510 series
c. OPNAVINST 3750.6E

Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

LIFE RAFT USED AS TUB

In Flight Surgeon's Newsletter 12-65, LCDR M. J. DUNNE, MC, USN aboard HORNET writes, "(no baths aboard ship)"... A seven-man inflatable life raft can be readily converted into a tub-type bath. Such a bath was utilized aboard HORNET in 1955. A hose bib was installed below the thermostat water control for the sitz tub. It was planned for use in the rapid rewarming of individuals following cold water immersion. As soon as the sick bay received notice that an immersion victim was being returned to the ship, the life raft was inflated in the sick bay head and filled by a length of hose from the aforementioned hose bib with the thermostat set at 115° F. Water temperature was maintained by allowing the water to run constantly and overflow the sides and down through the deck drains. This same equipment was aboard VALLEY FORGE during the Korean Action, and I believe, was instrumental in saving the lives of several downed aviators.

There is no reason why it cannot be utilized as a "tub" for rapid cooling as well, with the thermostat set at "cold." Pieces of ice can be placed in the tub if required.

-- CAPT J. W. WEAVER, MC, USN
Director, Aviation Medicine
Operations Division
Bureau of Medicine and Surgery

#

LET'S KEEP IN CONTACT

The BON HOMME RICHARD (CVA-31) is finally in the yard at Long Beach and amidst the chipping, sanding, and pounding noises coupled with the hiss of pneumatic hoses we take time to reflect on a very successful cruise completed. 21 April 1965 to 13 January 1966 was a long time.

LT J. M. VOLK has returned to civilian life to a pediatric residency, LT T. A. JOAS has returned to NAS Miramar and LCDR R. B. DILLEY has TAD'd to USNH San Diego to practice his specialty of thoracic surgery. LT F. E. SMITH, MSC, is admirably handling medical administrative problems.

The safety record compiled by "Bonnie Dick" during its past WestPac deployment we feel sure is enviable: Two deck crashes without personnel injury. Aside from the usual crushed toe or finger only two major injuries were encountered. These consisted of avulsion of the leg including muscle, nerve and tendons. Both were repaired by primary closure and made uneventful recoveries. A most interesting case was of an unfortunate individual impaled on a fork lift aboard another ship. He was "Heloed" to us and after surgery he too made an uneventful recovery.

Our most tragic case was of a death by heat stroke. In spite of heroic efforts by the Medical Department, including external cardiac massage, intubation, and artificial respiration that kept him alive for 15 hours the patient succumbed.

In so far as our previous TBC difficulty was concerned, this WestPac cruise produced one case of T.B. with only 6 converters. It is anticipated that with continuing screening this horrendous problem on the BON HOMME RICHARD has been surmounted.

As usual, the V.D. problem is cause for concern. Our eight cases of syphilis would indicate greater vigilance on the part of the Medical Department personnel with increased emphasis during our lectures regarding the effects, complications and cures of all types of venereal disease.

It is hoped that these few "pearls" of information may prove interesting and beneficial to our counterparts on other "bird-farms."

-- W. A. KORNBLUM
CDR, MC, USN

#

PEARLS....

1. Soon to hit the fleet will be an instruction to allow applicants for flight training to have a wider margin on certain phases of the physical examination. Increased tolerance of blood pressure and weight maximums are planned as well as an allowance up to a 1/4 diopter of myopia (only with the ability to read 20/20 unaided). This will allow a much larger number of college graduates to apply initially, thereby increasing selection capability.

2. Check the emergency packs of the SAR chopper in regards to the treatment of shock. Seems to me that a couple of blankets would be good gear to have for a 30 minute ride with a "shocky" patient.

3. Eyeballs: A guy must have his lenses on when he flies either as a pilot or an aircrewman. What good is an observer with 20/50 vision without lens correction to specs when watching out for a 2.0 mach aircraft.

4. Has anybody got a feeling for an aviator with triple qualifications or more? Best we can figure, this may be an unsafe area. With triple qualifications, a man must fly an awful lot of time each month to be fully qualified in all aircraft. Sometimes this is not practical. Look see if you've got a problem there.

5. On occasion, an MOR will show up with certain CNS abnormalities being implied throughout the document. These aviators are wonderful people and have a tremendous drive toward self-discipline. They are ambitious and agressive and view themselves indestructable. This type of personality is necessary for the job they do -- occasionally, after an aviator gets to the fleet, physiological changes occur and CNS tissue might become affected. If there is any indication toward self-medication -- take a look see. You know -- civilian physicians who are really not trained in our job are only $3.50 away.

6. Av/fuels officers are scrupulous when it comes to checking on fuels going into their birds. How long has it been since you've checked on availability -- preparation -- handling and acceptability of <u>flight lunches</u>?

7. Infectious syphilis has increased for the 7th year, 400% greater than 1957. Include an STS in differential diagnosis.

8. Recently tuberculosis has come into the foreground. Are you prepared to handle an outbreak? How many negative PPDs are stamped in your records? Treat your converters.

ENCLOSURE 1

A SKETCH OF THE EVOLUTION OF AVIATION MEDICINE
By LT D. H. KINZIE, MC, USN, VAW-33

Neglect of flying safety has been characteristic of aviation from the beginning. Recall the tragic ending of the mythological Icarus? This is the first recorded aerial accident. It occurred when Icarus failed to heed the advice of his father Daedalus and flew too high, allowing the sun to melt the wax in his wings causing his fatal plunge into the sea. The evolution of aviation medicine has somewhat paralleled the evolution of aviation itself. The great design engineer, Leonardo da Vinci is famous, among other things, for his work on model aircraft of the helicopter type, and he also drew designs of other types of aircraft which in some respects were very similar to those in use today. The first successful flight, if gliding from a housetop to the ground can be called a flight, was made by Besnier, a Frenchman; later Sir George Cayley of England designed toy helicopters that flew and a fixed wing glider that lifted him off of the ground; and Henson and Strongfellow flew aircraft propelled by springs and one by means of a small steam engine. This was the first successful powered flight. On 17 Dec 1903, the Wright Brothers marked the real beginning of the aeronautic industry with their first successful flight at Kitty Hawk, N. C.

Just seven years later the Germans drew up minimum standards of military pilots. In June, 1913, Ernst Koschell made a report of these minimum physical standards and beginning in 1915 a service for the medical control of aviators functioned regularly in Germany. In 1918, General Pershing cabled the United States for men and officers who could aid him in the medical control of military aviation. On 15 Oct 1918, the following report was made: "In spite of the shortening days and increasing inclement weather excess of flying hours over previous records were: Per day 22.11; per week 759.03; per month 1,869.47; and from October 15 there had been the best record of 4,436.46 flying hours without a death. On Oct 17, it was announced that for the first time in the history of the fields, there were 600 planes in commission. To this great improvement in flying conditions Aviation Medicine contributed largely."

Upon returning to the United States, a special mission recommended that selected medical officers be given a course in aviation medicine and assigned to American flying units. These specially trained officers were to study the effect of flight on the pilot, act as his confidant and advisor, and also act as an intermediary in medical matters between the flyer, his Commanding Officer, and higher medical authority. In March 1918, the term "Flight Surgeon" was coined. Soon afterwards foreign armies adopted the term and its use has gradually spread until today it is universally applied to anyone engaged in the practice of aviation medicine. In May 1919, a new section of the Air Service Medical Research Laboratory was established for the purpose of training flight surgeons for duty with the Air Service Organizations. This was set up at Mitchell Field, Long Island, and was known as the School for Flight Surgeons. In December 1922, the name of the school was changed to School of Aviation Medicine. In June 1926, the school

was moved from Mitchell Field to Brooks Field, Texas and in October, 1931, to Randolph Field, Texas. The first course of instruction for flight surgeons covered a period of eight weeks. This was said to be a success in raising the morale and efficiency of the flying personnel and at the same time markedly reducing the accident rate.

Parallel to the development of aviation medicine was the development of flight physiology. There is a recorded account of two gentlemen, Glaisher and Coxwell who in 1862 made a balloon ascent to an altitude of approximately 29,000 feet. The account tells of a series of "strange symptoms" marked by loss of visual acuity and hearing, paralysis of the legs and arms, and finally by unconsciousness. One of the experimenters had the presence of mind to seize the valve rope with his teeth and start the balloon downward.

In 1878, a physiologist by the name of Paul Bert published a 1,168 page paper, "La Pression Barometrique" based on a flight Tissandier and two others had made in 1875. The following episode is taken from this account: "I now come to the fateful moments when we were overcome by the terrible action of reduced pressure. At 22,900 feet... torpor had seized me. We are rising. Croce is panting. Sivel shuts his eyes. Croce also shuts his eyes... at 24,600 feet the conditions of torpor that overcomes one is extraordinary. Body and mind become feebler... There is no thought of the dangerous position. One rises and is glad to be rising. I soon felt myself so weak that I could not even turn my head to look at my companions... I wished to call out that we were now at 26,000 feet, but my tongue was paralyzed. All at once I shut my eyes and fell down powerless and lost all further memory."

Their balloon ascended to 28,820 feet and then descended of its own accord. Tissandier recovered. His companions were dead. Three years later Bert published "La Pression Barometrique" proving that the principal effect of high altitude was due to the decreased partial pressure of oxygen, a fact of profound significance to all flight surgeons even in this day of space flight.

The modern flight surgeon's immediate responsibility is the physical physiologic and psychologic well being of all flying personnel. This encompasses training lectures, orientation towards usage of airborne personal equipment, maintenance and supervision of physiological training devices, physical examinations of all flying personnel, participation in squadron safety programs, frequent and close contact with all flying personnel, liaison between flight personnel - commanding officer - and higher medical authority, continuous assessment of personal readiness and survival equipment readiness and advisor to commanding officers in medical matters. Towards these ends the Navy has sent each of us through six months of training at the Naval Aerospace Medical Institute formerly the School of Aviation Medicine at Pensacola, Fla.

During World War I, noncombat aircraft fatalities were three times the number due to enemy action. Interpreted in hours of flying time, one crash occurred for each 241 hours, and one fatality for each 721 hours. Ninety percent of all aircraft accidents were due to pilot deficiencies during that early period. The first fatal airplane accident, however, was due to material failure. This occurred 17 Sept 1908 when the propeller broke on the Wright Flying Machine flown by LT SELFRIDGE.

The flight surgeon of today is expected not only to be a physician caring for a specific group of patients, but an investigator at the basic level of applied research. The analysis of aircraft accidents with a goal of reduction of the destruction of life and property is certainly the most challenging demand made upon the modern flight surgeon. We should not be satisfied to merely categorize causes and effects, but we should also seek answers and solutions to basic problems of aviation safety. The old questions of man versus machine have been argued for ages. There is ultimately the degree at which the division of aircraft accidents into human and machine failures is nonsensical. Obviously the perfect machine would reverse, compensate or nullify any human error which might occur. Conversely, the perfect man would compensate for any deficiency of his machine or perhaps he wouldn't need a machine at all. Having neither the perfect man or machine, some have felt it necessary to attempt to evolve or otherwise create the perfect flight surgeon. At the present writing, however, we must be satisfied with the imperfect machine, the imperfect man and the imperfect flight surgeon... unless you have some information not yet available to me.

References

1. Armstrong, Harry G., M.D., Principles and Practice of Aviation Medicine. Baltimore: The Williams & Wilkins Company, 1939.

2. Bert, P., La Pression Barometrique. Paris: Masson et Cie, 1878.

3. Crouchet, R. and Moulinier, R.: Air Sickness. New York: Wood & Co., 1920.

4. Maublanc and Ratie: Medical Examination of Airmen. New York: William Wood & Co., 1921.

5. Manual of the Medical Department. Department of the Navy, Bureau of Medicine and Surgery, Washington, D.C., 1964.

#

Enclosure (1)
to FSNL 4-66

FOR OFFICIAL USE ONLY

No. 5-66

Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

HABIT INTERFERENCE

The term habit interference as applied to the role of human factors in accident analysis is frequently seen in the major, contributing, or possible cause column in MOR's involving pilots currently qualified in several types of aircraft. In a recent analysis of an aircraft incident resulting in a crewmember fatality, habit interference was a major factor contributing to the mishap. Because of relatively few reports of this factor as a major cause in mishaps involving non-aviator crewmembers, the following summary is submitted and should prove interesting to flight surgeons and possibly beneficial in their mission of accident prevention.

At the termination of a 7.9 hours logistics flight at 0006, the loss of the starboard engine of the C-123B on rollout resulted in a stack fire. This fire was quite apparent to the occupants in the cabin darkened by electrical failure associated with the engine loss. As the aircraft rolled to a stop, the crewmembers in the cabin were on their feet in search of fire bottles. One crewman apparently found a fire bottle almost immediately, and before he could be restrained, opened the forward port hatch and left the aircraft to fight the fire. As he exited, he turned aft into the idling prop immediately sustaining a fatal head injury.

This man was relatively new to aviation, having been assigned to an operational unit for about nine months. Apparently in this time he acquired considerable experience as crewmember in the HU-16E but because his rate is not usually required aboard the C-123B, he had acquired virtually no experience in this aircraft. It is noted that he had flown 26.5 hours in the HU-16E during the 30 days preceding this accident while acquiring zero hours in the C-123B. He had one flight in the C-123B for 2.5 hours eight months prior to the accident.

The HU-16E has only one hatch that is usable during normal operation, this hatch being located on the port side, well aft of the engines. The C-123B has three usable hatches, the forward port hatch being frequently used (with standard operating procedure requiring the hatch to be secured during operation of the port engine). This man had acquired his aviation experience in the HU-16E, always entering and leaving by the only hatch. His experience in the C-123B was also probably limited to entering and leaving by one hatch, this being the forward

Flight Surgeon's NEWSLETTER

WHAT PRICE PRIDE?

Recently on a cross country in a good old dependable US-2B an opportunity presented itself to an aviation physiologist to observe firsthand an incident of the kind which causes flight surgeons and aviation physiologists to develop gray hair and other diseases of the trade.

Take off, climb out and cruise set were all normal, but one of the crew noticeably was favoring an obvious pain in a left sinus area. This "little sinus problem" could not have escaped his attention prior to the flight but a commitment had been made and natural pride overrode an officer's judgment. At the first refueling stop, letdown caused pain and a toothachy sensation. Approximately 25 minutes following landing, the officer felt a need to blow his nose. Immediately a copious, bloody discharge followed, the inevitable result of an acute sinus block. Still the return leg of the hop remained. What should be done? The flight was completed with a repetition of the drainage and a ground chit at the home base with a round of antibiotics.

Pain is a strong concentration distractor. Because of this acute pain, what was gambled in case of emergency? How many of these incidents and similar ones unfold each day and with what results on the accident rate? How many of us have let pride and personal desire to complete an assigned task affect our good judgment when we were not in an acceptable mental or physical condition to tackle the task?

Make sure all your pilots are familiar with the workings of the sinuses. A relatively small thing such as a blocked sinus on the deck can be an emergency at altitude. Evidently aviators still don't have the word about colds and flying.

-- LT C. C. COLE, MSC, USN
NASC Aviation Physiologist

#

FOOD FOR THOUGHT: LIP SERVICE

Considerable time, money and effort is invested every year in an attempt to eliminate accidents. Periodicals are published by many, many agencies, from NASC to Group level, which expound the virtues and benefits of safety. Clerks and typists spend hundreds of man hours gathering, sorting and disseminating statistics, publishing stickers and posters, and responding to correspondence demanding more of the same. Investigation teams spend fortunes in money, man hours, and mental efforts to solve accidents and incidents to aircraft, aircrews, support equipment and facilities. Commanders from units of every size spend hours lecturing, directing, coaxing, ordering, surveying and scratching their heads in attempts to eliminate accidents, to improve the records and to increase Unit Combat Readiness..... BUT ..... These same Commanders smoke big fat cigars as they wander to and fro in the "No Smoking" areas of their flight lines, bellowing their wrath to an overworked mech who has dropped some FOD and hasn't had the

chance to pick it up. These Commanders taxi with their canopies open when every Lieutenant in the outfit knows he would catch three kinds of hell if he did the same.

Operations officers preach strict NATOPS compliance in the AOM, then hop in their helo and launch downwind (or hit the break at 350 knots in an F-4 when the Ops Manual dictates a max of 250 knots over the numbers).

Quality Control NCO's preach "the proper tool for the job," then assist in jury rigging a pre-oiler using a Rube Goldberg design because yours is down, and they wouldn't ask to borrow one from the squadron next door on a bet.

NATOPS types hold surprise flight gear inspections and growl unprintables at offenders when the seams of their own gloves are split, and their worn boots wouldn't last three days in a survival situation.

ASO's preach ALL manner of clever deeds and thoughts which ALL of us should comply with ALL the time, and yet they come to work without eating breakfast, or carry a check list they never use.

Most units have good, conscientiously thought out pre-accident plans, storm bills, flight line procedures and safety directives. Most units have established NATOPS programs. Most units have qualified, experienced, current Ops Officers, ASO's and NATOPS Officers. All units sincerely desire to prevent accidents and have the flyingist, shootingist, most professional combat ready team in the business. And unfortunately, all too many squadrons pay lip service to safety.

You know your outfit is good! You know your team members are striving to do their utmost to improve every facet of your squadron. You owe it to them to comply with your own directives, policy, and procedures, and to demand the same compliance from every other member of your unit.

You can have a genius for an ASO, an Astronaut in the Operations billet, and an MIT grad in the Quality Control slot and it won't help your safety record, combat readiness posture, or your ulcers if you pay lip service to your Safety Program. Your current safety program is probably just what you need without revisions, if you'll only use it. As in most things the movement begins at the top. Roll down your flight suit sleeves and put out your cigar! It is time to eliminate lip service and really get serious about YOUR Safety Program.

-- COL F. C. LANG
Commanding Officer, MAG-25
MARTC Bul 3750, 17 Nov 65

F/S Newsletter 5-66

PEARLS....

1. Have just read an MOR with four fatalities involving a section of aircraft. They had returned to the field and were about to report a 10 mile final when the lead aircraft entered an area of reduced visibility and ran into a hill along with his wingman. The leader was a 45 year old flying with a waiver, in high performance aircraft.

The investigating flight surgeon reports, "He had one month prior to the accident passed his annual physical. He had dieted, exercised, abstained from alcohol and decreased his smoking. In this 'abnormal' state he just managed to pass. This may have had nothing to do with the accident but it is often the case that especially older or borderline qualified pilots are examined once a year and that is the only time they can pass for they are primed for the physical which therefore is not a true reflection on their 'normal' state all year round.

"This of course applies especially to their cardiovascular status." Continued vigilance by flight surgeons who have aviators in such situations is mandatory. This actually is preventive medicine to the n^{th} degree. Diplomacy here is also very necessary because these aviators and their commanding officers are all working in their job of being professional aviators. Watching their general health is important to them but at times slips into the background. Guess what? That's where you come in.

2. Re the piece on page 3: "Food for Thought: Lip Service," while not directed to flight surgeons, has, we think, a great deal in it applicable to anyone's safety situation.

3. The article on habit interference was written by CDR Andrew F. HORNE, USPHS, stationed with the Coast Guard at Port Angeles, Washington.

4. This year the Aero-Medical Department of the Naval Aviation Safety Center furnished another outstanding display to the Aerospace Medical Convention held at Las Vegas, Nevada. The theme was in keeping with the local atmosphere and consisted of a slot machine roughly 6 ft. tall, 4 ft. wide, and 5 ft. deep. There were three "windows" across the top of the front and a fourth lower in the front. Projected on these "windows" in synchronized series of color slides were various naval aviation safety cases. Pulling the slot machine lever changed the slide sets. The fourth "window" showed the payoff with lemons, cherries or a jackpot, depending on the plot of the particular story told. Hope you made the convention and got to see everyone. It was one of the best yet.

5. We will try to print some abstracts of the more important papers given at the convention in the next few issues.

6. LT Charles C. COLE, MSC, USN, an Aviation Physiologist, has been assigned to the Aero-Medical staff of the Safety Center. LT COLE formerly was attached to the Aviation Physiological Training Unit at NAS, NORVA. (He is also a student pilot working toward a private license.) Hope all will utilize the additional services offered by the Center.

#

FOR OFFICIAL USE ONLY

No. 6-66

Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

ELECTRIC BLANKETS FOR RAPID WARMING

The methods previously described in the Flight Surgeon's Newsletter (4-66) for rapid warming subsequent to immersion are no doubt effective, but they are messy aboard a carrier. We found that it was much more convenient and esthetic to retain four electric blankets in the Sickbay for use for this purpose. Patient acceptance was 100% and prolonged warming was more efficient. The Chief Engineer will appreciate the water savings.

N. V. WHITE
CAPT MC USN
Senior Medical Officer
U. S. Naval Air Facility, Washington, D. C.

#

ALCOHOL AND AVIATION

The following is a handout from the flight surgeon at NAS Seattle:

Flying requires a high degree of judgment, attention, coordination and performance - much higher than that required to operate an automobile. A man is generally considered unfit to drive an auto when his blood alcohol level nears 150 mgm%, yet a measurable decrease in performance in aircraft is found with levels of only 20 mgm%! Measurable levels in this range were found in 35% of all general civilian aviation fatalities in the past year ----- 35%!

A few facts will help you understand why so many of us fly thinking ourselves free from any effects of alcohol.

1. At 10,000 feet there is a twofold increase in the effects of alcohol. An amount that would produce no effects at sea level could cause ruination at altitude.

2. Your body requires 3 hours to rid itself of 1 ounce of alcohol. And contrary to popular opinion, this cannot be altered by pills, eating, sleep, or coffee -- no more than a 45° angle of attack will win you long life and greater lift! It's true a full stomach will give you a lower concentration of blood alcohol, but this has nothing to do with the clearance rate of alcohol -- it's still aboard you.

3. Post-alcoholic effect (hangover in its severe form) is as detrimental to your thinking and performance as the alcohol effect itself. Decrease in performance can be measured for as long as 10 hours following total clearance of all alcohol from the body -- and this is little affected by any "remedies" you may have gleaned from sympathetic and well-meaning confreres.

How soon can one safely fly after drinking? The best rule is to wait at least 10 hours after all alcohol has been cleared from the body (and that's 3 hours per ounce consumed). How dangerous is it to fly with traces of alcohol in your blood if you decide to "take a chance"? In the aviation accidents mentioned above, the average duration of flights from take-off to write-off was 18 minutes!

THERE SHOULD BE ONLY AS MUCH ALCOHOL IN YOUR BLOOD AS THERE IS MOLASSES IN YOUR FUEL!

--- NAS Seattle Safety
Council Minutes

#

THE IMPORTANCE OF A MEAL

A normal sized man lying still in bed will metabolize approximately 1700 calories of energy each 24 hours. If food intake is considered for this same man the level increases by about 250. This gives a total of nearly 2000 calories one must have from somewhere to just remain alive each day. Below are listed a number of activities and the energy in calories per hour required to complete them.

Activity	Calories per hour
Sitting-at-rest	100
Walking slowly	200
Exercise (depending on degree)	290 to 450
Swimming	500
Running	570
Sawing wood	480
Walking up stairs	1100
Typewriting	140
Carpentry or painting	240

From this utilization chart we can see that even a conservatively active individual requires many times the basal metabolic level to adequately carry out a workday routine.

To give our utilization chart meaning, below are listed some energy sources in caloric value.

Food	Amount	Calories
Butter	1 tablespoon	100
Blue cheese	1 ounce	104
Whole milk	1 cup	166
Non-fat (dry) milk	1 tablespoon	28
Grapefruit	1 cup	77
Apples	1 apple	87
Farina	1 cup	625
Steak (lean)	3 ounces	293
Beer (4% alcohol)	12 ounces	100 approximately

Combining the two charts, one can see that in some way the output must be equaled by the input to remain stable.

Review of recent MOR's shows more than a few documented missed meals. One flight surgeon in particular stated, "The pilot habitually skipped breakfast. While this is a bad habit, it is common knowledge that this is a general practice of aviators." When blood sugar level drops to 80 to 90 mgm percent 8 hours following food ingestion, no adverse effects usually would be noted. If the fasting period continues and unusual or emergency situations cause further drop with CNS hyperactivity and subsequent endocrine envolvement, an acute sugar level of 50 to 70 mgm percent may be reached with serious symptoms, such as hallucinations, trembling, profuse sweating and generalized weakness.

Probably more emphasis should be placed upon the absolute fuel requirements of the body in certain situations as related to food intake. A machine out of fuel just won't run. Aircrewmen should eat properly.

--- LT C. C. COLE
Aviation Physiologist

#

ACCELERATION ATELECTASIS

The following article was contributed by LT Philip T. BRISKA, flight surgeon of VX-4:

"I picked up a small coin lesion on the annual chest x-ray of a senior pilot and became quite alarmed when the repeat x-ray showed that in addition to the coin lesion, there were several radio-densities consistent with atelectasis at the bases. Thinking that the original lesion had been the first evidence of a rapidly progressing disease, I seriously considered sending him to the hospital as an emergency admission, although there were no signs or symptoms.

"On further consideration I decided that this was a case of acceleration atelectasis. (Ernsting's October 1965 article in Aerospace Medicine, 'Influence of Alveolar Nitrogen Concentration and Environmental Pressure Upon the Rate of Gas Absorption from Non-ventilated Lung,' is one of the latest on this subject.) I recalled that my patient had pulled about 3 G for an extended period about an hour prior to taking the second x-ray. If this were a case of acceleration atelectasis it would clear within hours or days. I therefore sent him to the hospital for evaluation with no great haste. The plate-like radio-densities were absent on his films taken three days later and the coin lesion was eventually evaluated as healed histoplasmosis.

"Over the years, I've occasionally experienced coughing after flights at high G for prolonged periods and have spoken with pilots who've felt chest discomfort as well. According to Ernsting (from the R.A.F. Institute of Aviation Medicine) and others, the problem arises when under high G there is perhaps collapse of some of the intermediate-sized airways in the lower parts of the lung. The oxygen in the affected alveoli, at high concentration while breathing 100% oxygen, becomes rapidly absorbed by pulmonary capillary blood. This blood flow rate is, in fact, higher than normal because of pooling and distention of the dependent pulmonary vasculature at this G load. E.g., at 3 G the upper third of the lung is not perfused. Ernsting suggests that protection can be provided by 40% nitrogen up to a cabin altitude of 25,000 ft. The nitrogen in the alveolus under these conditions prevents prevents it from collapsing.

"It has been found that the factors which increase the likelihood of acceleration atelectasis are: Breathing 100% oxygen, wearing an anti-G suit, decreased cockpit pressure and accelerations over a prolonged period. A centrifuge experiment has shown that 100% oxygen at sea level at 4 G for 75 seconds collapses some-what less than 600 ml. of alveoli, and will produce x-ray changes but not symptoms (as with my patient). I feel age and previous lung disease are also factors. As far as I know, the effects of breathing oxygen at slight pressure, as we do in the Navy, have not been studied.

"I might suggest that the reason this is not often seen on annual x-ray of jet pilots is that most physical exams are scheduled in the morning, many hours after high G flight. Also, the only time individuals would tend to experience high G for long periods is when simulating or engaging in air-to-air combat (dogfighting). One does air-to-ground delivery at low altitude and pulls G for

only a few seconds at a time. Pilots of F-8's and F-4's, however, while dog-fighting, often pull several G at high altitude for prolonged periods.

"As far as anyone knows there is no danger if a pilot is asymptomatic. However, fighter squadron flight surgeons should be aware of this syndrome and insure that pilots experiencing post-flight chest discomfort or coughing be thoroughly evaluated prior to their next flight. Fighter tactics instructor pilots might be especially susceptible to this syndrome.

"It is only in the last 10 years that we have had aircraft capable of pulling high G at high altitude for minutes at a time, so I don't think that anyone knows the long-term effects of repeated acceleration atelectasis. But I don't imagine it does the lungs any good. This seems to be one more argument for providing our aircrew with a more physiologic gas mixture."

#

PEARLS....

1. Dr. Robert McTAMMANY has reported aboard the Naval Aviation Safety Center as numerical relief for Dr. Nic BROUSSARD who will be going to the U. S. Naval Hospital, Portsmouth, Virginia, as a resident in surgery. Dr. McTAMMANY comes from VAW-12 and NARTU here in Norfolk where he has been stationed for the past two years.

2. All flight surgeons are reminded that contributions to the Flight Surgeon's Newsletter are welcomed. How about sharing some of your knowledge and experience with your fellow flight surgeons?

#

CHANGE IN ANNUAL FLIGHT TIME REQUIREMENTS

Two changes in annual flight time requirements have recently come out, both of which substantially reduce the minimum flight time required of naval flight surgeons:

1. OPNAVINST 3710.7C, 1 Nov 65, NATOPS Manual - General Flight and Operating Instructions states that for naval flight surgeons the annual minimum Special Crew Time will be 48 hours per fiscal year or 24 hours per six months with no requirement for night time.

2. CNO message 110008, May 1966, references the above instruction and directs that these same flight time requirements are presently in effect so that the minimum flight time requirement for the present fiscal year ending June 30, 1966 will be 48 hours, as above.

#

ENCLOSURE 1

Clinical Aviation and Aerospace Medicine

New Therapy of Motion Sickness

LT. CMDR. PAUL L. STEBBINS, MC, USNR

Motion sickness is associated with fear which produces decreased motility of the gastrointestinal system. Treatment with Urecholine aimed at increasing intestinal motility has been found to be successful in the relief of motion sickness symptoms.

PRESENTLY THE PRIME CONSIDERATION in the therapy of motion sickness is prevention.[1] Little has been done to give relief to those in which the preventive measures have failed. They are usually treated with heavy sedation and bed rest. This produces a nonfunctioning individual, a situation to be avoided especially in the military services. A remedy for this problem is presented here.

The three types of motion sickness, car, sea and air, all have in common some degree of disturbance to the vestibular apparatus. They also have in common a factor which is presently receiving more consideration in the literature, i.e., the psychological aspects. Past therapeutic efforts have consisted of preventive therapy with Dramamine® or similar compounds, for the vestibular disturbance. Concomitantly, an anticholinergic is also given to reduce gastric acidity and phenothiazines are used for their antinausea qualities. These medications are effective in some cases. Their effectiveness may be largely due to the reassurance of the physician and the placebo effect of having medication.

The psychological aspects, however, deserve more consideration. Fear is definitely present in flying sickness, to a lesser extent in sea sickness and is probably present in car sickness. It is true that the rougher the ride, i.e., the storm at sea and in the air, the greater the frequency and severity of the sickness. This has been felt to be due to the increased motion; however, one cannot deny that these situations will greatly increase the conscious and unconscious fear associated with the situation. Individuals with destroyed inner ears have less air sickness, perhaps because there is a marked reduction in supratentorial stimulation regarding changes in position, attitude, etc., during rough rides.

Since many patients are not helped by the above described medications and these seem to be the ones with the most anxiety, a therapuetic approach for the fear reaction (flight or fight) was considered.

If we assume the nausea is secondary to fear, in the fear reaction the sympathetic system is dominant, resulting in decreased intestinal activity, i.e., secretion and motility. This correlates with the condition of food seen after emesis. The food is masticated but undigested, even though it has been some time since it was ingested.

The therapy selected was one which would increase intestinal motility rather than decrease it. Eight patients with air sickness, which consisted of severe nausea with emesis, were given Urecholine® five (5) milligrams sublingually at the first onset of stomach discomfort, to be repeated one time in thirty minutes, if symptoms persisted. All patients reported this controlled their symptoms completely.

One additional patient, who had severe continuous emesis starting at take off of the aircraft, was treated with Compazine® five (5) milligrams P.O. one hour prior to flight time and then Urecholine® as described. This treatment was successful and after several familiarization flights, during which his symptoms progressively abated, he discontinued first the Compazine® and then the Urecholine.®

Nine patients, with sea sickness, were treated with Compazine® five (5) milligrams and Dramamine® four (4) milligrams 2 hours prior to boarding. They still became nause but this nausea was relieved by sublinguial Urec e® five (5) milligrams. Medications were repeate every four (4) hours at the patients' discretion.

Treatment with Urecholine® five (5) milligrams sublingually, of nausea caused by motion, has been successful to date, and it is felt wider evaluation is indicated.

From the Station Hospital, Box #2, U. S. Naval Air Station, FPO, San Francisco, California. 96667

REFERENCES

1. TRUMBILL, RICHARD, *et al.*: Effect of Certain Drugs on the Incidence of Seasickness. *Clin. Pharmacol. and Therap.*, 1:280-283, 1960.

Enclosure (1) to
FSNL 6-66

FOR OFFICIAL USE ONLY

No. 7-66

Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center).

EMERGENCY CARE OF OCULAR INJURIES

The following comments are intended only as a guide to assist the attending medical officer in initial treatment of ocular injuries while the patient awaits transfer to facilities with an ophthalmologist, when indicated. Although many minor and a few major injuries to the eye can be managed quite effectively in the general fleet facilities, there will also be many times when the general medical officer will seek assistance. When delays in consultation or referral are necessary for either reason of fleet operations or problems in personnel transfer, the following suggestions may be of benefit.

First, we only have two eyes; they are delicate and demand respect. Second, all eye problems do not need local steroids. They can be disastrous in dentritic keratitis and long term use can produce a secondary glaucoma; so use them when indicated only. Third, lacerations in the lid and periorbital area require closure (6-0 silk suture) just as lacerations anywhere, and special handling is needed only when the lid margin or naso-lacrymal apparatus is involved. These should be referred to an ophthalmologist.

External injuries as contusion, ecchymosis and hematoma usually need only ice bags to reduce swelling and prophylactic antibiotic drops while the eye is swollen shut. (Any injury of this nature is always a potential orbital floor fracture and should be evaluated with this in mind.) With laceration, infection or proptosis, systemic antibiotics, tetanus prophylaxis and pressure dressings may be indicated.

Injuries to the globe itself externally as traumatic, chemical or exposure keratoconjunctivitis, subconjunctival hemorrhages and small conjunctival lacerations will usually respond well to a local antibiotic ointment. Corneal abrasions in addition will require a light pressure dressing. More extensive lacerations in the conjunctiva may require suturing and again referral might be best. Alkali burns are much more serious than acid burns to the eye and need copious irrigation of the eye with normal saline immediately if it is to be saved. After this a local steroid dressing is needed and referral immediately to an ophthalmologist.

Contusion to the globe itself can produce anterior chamber hemorrhage (hyphema), vitreous hemorrhage or retinal hemorrhage. The hyphema could result in a serious secondary glaucoma, and the vitreous and retinal hemorrhage may be a warning of very serious injury. These should all be referred to an ophthalmologist, and placed on bed rest with their heads elevated about 30^{o} (this lets the blood pool inferiorly away from the visual axis). One might also patch the injured eye and place a pin hole shield over the fellow eye for immobilization. Other intraocular injuries such as iris tears (iridodialysis), dislocated lens, choroidal and retinal detachments should all be placed on bed rest and referred.

Ruptured globes and perforating corneal lacerations all need immediate ophthalmological care if the eye is to be saved; and there are times then when it can't be saved and must be enucleated to prevent sympathetic ophthalmia from destroying the fellow eye. Sympathetic ophthalmia is rare (less than 1% of traumatic injuries to the uveal tract) but when it happens, the results are disastrous. Also, sympathetic ophthalmia has never been reported in less than 10 days from the time of injury, so we have time to ponder the problem and arrange the transfer to the appropriate facility.

It may well be noted that use of cycloplegic, mydriatic and miotic agents have been omitted from this discussion. They warrant special consideration to avoid complications and are seldom necessary in emergency care.

--- W. G. BULLINGTON
LCDR, MC, USNR

* * * * * * *

LCDR Walter G. BULLINGTON is a flight surgeon in the Naval Reserve attached to NARTU, NORVA, who practices ophthalmology in Charlotte, N. C. He has written a series of five very pertinent, informative articles for the FSNL, the first of which are published in this issue. Many thanks from the Safety Center to Dr. BULLINGTON.

How about the rest of you reserve flight surgeons who enjoy the FSNL -- perhaps you could also give us a hand. You have many years of experience -- general and special -- beyond that of most active duty flight surgeons. Concise, informative articles about common problems would be very useful and appreciated by both FSNL readers and editors.

#

SUBSEQUENT DUTY

Because every flight surgeon considers various alternative courses of action following a tour of duty, it is pertinent to outline several of these alternatives and give specific information about each.

I. Regular Medical Officers:

A. Flight Surgery: If an additional tour as a flight surgeon is desirable, it is highly likely that one may be obtained. In fact, a specific request can often be granted. One should communicate with the Aviation Medicine Section of BUMED to consider this selection further.

B. Aviation Medicine Residency: If further training in aviation medicine is desirable, the three-year aviation medicine residency is an excellent answer. Completion of this program puts one in a fine position to pursue a career in Naval Aviation Medicine, and after a certain period of practice, makes one eligible for the American Board of Preventive Medicine in Aviation Medicine. Further information may be found in BUMEDINST 1520.10C.

C. Naval Residency: Naval residencies are available in most specialties at various hospitals in the United States. After a tour as a flight surgeon, the candidate for one of these residencies will be given high priority. Further information may be found in BUMEDINST 1520.10C, which lists the residencies, locations, durations, obligated time incurred, application procedure and so forth.

D. Extension: If it is desirable to extend one's present tour of duty for a short period of time, for any of various reasons, this may often be done. The administrative officer or personnel officer will be able to help make such arrangements.

E. Release from Active Duty: If the flight surgeon desires to "get out" of the Navy entirely, a letter of resignation must be submitted. The proper form for this letter is described in the BUPERS Manual, Part C, Article 10327 "Forms of Officer's Resignation, (1) Unqualified Resignation." This letter should be submitted about eight months prior to the end of the obligated service. Before getting out of the Navy entirely, one should consider the advantages of remaining in the Reserves as a "week-end warrior." This requires only one weekend a month and two weeks a year of active duty, and there are professional as well as financial benefits. Information about the Reserve program may be obtained by communicating with the Chief of Naval Air Reserve, U. S. Naval Air Station, Glenview, Illinois, or by contacting any local Naval Air Reserve Training Unit (NARTU) or Marine Air Reserve Training Detachment (MARTD).

II. Reserve Medical Officers: All of the above alternatives are available to the reserve medical officer with several significant differences outlined below.

A. The flight surgeon must agree to accept a regular commission if he is given a Naval residency.

B. If he elects to continue as a flight surgeon, he may desire to augment to the Regular Navy for the purpose of enhancing his career security and opportunities. Information about this procedure may be obtained from the administrative officer.

C. If release from active duty is desired, no letter of resignation is necessary; release is automatic upon completion of the tour of obligated service.

It is worth noting that many senior flight surgeons are retiring and the future for younger men is exceedingly bright. Early advancement to positions of more administrative responsibility is very likely.

#

RED FILTER FOR DARK ADAPTATION

Under the effect of scotopic vision (dark adaptation) the retinal receptors (rods) are most sensitive to stimuli in wave length 510 millimicrons (green). If one uses a red filter and allows only red light to stimulate the retina, vision can be retained while dark adaptation proceeds. It takes approximately 30 minutes to reach maximum dark adaptation, yet most all this can be lost with only a 20 to 30 second exposure to bright white light. This principle of enabling airmen to read, play cards, etc., in red light while undergoing dark adaptation for night flights was first applied in World War II with great success. This same principle is utilized by radiologists dark adapting themselves for fluoroscopic studies.

--- W. G. BULLINGTON
LCDR, MC, USNR

#

STANDARD HAND SIGNALS TO RESCUE HELICOPTERS

The Helicopter Rescue Symposium of May, 1966 agreed on two standard hand signals to be used by survivors in the water to indicate whether or not they need the assistance of the helicopter rescue crewman.

1. Either hand raised in air: "Everything's OK, no help needed."

2. Neither hand raised, both in water: "I need help."

It was agreed that these hand signals should be given outside the rotor wash as the helicopter approaches, not inside rotor wash where visibility would be poor and confusion might result. It is planned to publicize the signals by posters and wallet cards as well as decals to be placed inside helicopter cabins.

Representatives of both AirPac and AirLant attended the symposium.

#

MISCELLANY

1. We'd like to call your attention to an excellent article in the July, 1966 Approach by LT R. E. ATKINS, MC, USNR. It's titled "So Who You Kidding, Tiger?" and deals with the hazards of astigmatism in a carrier pilot. Incidentally, Approach welcomes short (or longer) articles from flight surgeons. You don't have to be a professional writer; the staff can edit your material. But what they can't come up with by themselves is your first-hand experience with fleet squadrons. (When it came to editing, they tell me that Dr. ATKINS' article was exceptional -- nothing required. It went right in the "book.")

#

FOR OFFICIAL USE ONLY

No. 8-66

Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

HEAR! HEAR!

Probably one of the most punished organs of the body is the ear. It is mechanoceptive in that it responds to the vibrations of sound waves in the air. Normally the ear is expected to deteriorate with age and hearing acuity follows a reasonably predictable curve. Recently, an investigator encountered some very interesting exceptions to this rule in African tribes not exposed to any unusually loud noises during a lifetime. As a result the elderly retained excellent auditory ability. Those of us who are exposed to aircraft engine noises and all the background noises that accompany them should ever be alert to auditory damage. The ear itself attenuates by as much as 30 decibels excessive noise by a contraction of the stapedius and tensor tympani muscles. Often this is not nearly enough protection and we must introduce some artificial means. The effects of noise are by no means isolated to just hearing loss. A survey in 1959 and 1960 of several thousands of Marine Corps personnel revealed personality disorders directly attributable to prolonged exposure to high level noise. Particular attention was paid to aircraft mechanics who worked around jet engine test stands. The family life was found to be directly affected. Family quarrels were extremely high amongst this group and significantly dropped when the personnel were reassigned to relatively quiet areas. During baseline audiometric testing of these personnel a number were unable to follow the range of a good stereo set. (All prospective stereo buyers might save money by an audiometric test. Why pay $1,000 for something you can't hear anyway when a $50 set would suffice?)

There are many ways to protect personnel from permanent hearing loss due to high noise level exposure. The flight surgeon shoulders most of the responsibility for this. First a very thorough education program should be initiated. Explanations of what noise is, how it is generated, transmitted, received, and its effect on the body is appreciated with interest by all. (There are three excellent films available. Their titles are Medical Aspects of High Intensity Noise and their numbers are MN-9318 A, B, and C.) The issuance, fitting, and follow-up program of all ear protective devices is extremely important. Poorly fitted plugs or helmets will not be utilized. Proper and rigid control over the wearing of protective devices should be maintained. One method is to issue reminder chits to those found not wearing devices when needed. Base line audiograms should be checked against current ones every six months to detect appreciable loss early to prevent its becoming permanent.

Until the hearing mechanism develops its own reliable attenuating system we must care for it properly.

-- LT C. C. COLE
Aviation Physiologist

#

CONTACT LENSES FOR AVIATORS

Recent interest and inquiries into the use of contact lenses by pilots have prompted the following comments. There are pros and cons to their use, and one must decide in each individual situation whether they would be advantageous.

Factors in favor of contact lenses for flyers are: 1) better visual acuity in general than with spectacle correction, especially in high refractive errors, irregular astigmatism and keratoconus; 2) field of vision is greater with less distortion of images as they deviate further from the visual axis; and 3) contact lenses produce no problem with fit or wearing comfort of goggles, helmet, earphones or other apparatus necessary for pilots.

The unfavorable factors are:

1) The variable adaptation period until one is able to tolerate contact lenses for a full day's wear. This usually is a month or more and some people can't tolerate them even with an accurate fit.

2) Infections, allergies and other ocular pathology may contraindicate wear for temporary periods.

3) Foreign bodies under a lens are extremely painful and usually the lens must be removed in order to remove the foreign body. This could be hazardous in flight.

4) Contact lenses have to be kept immaculately clean and even fingerprints on a lens are enough to produce foreign body sensation in some people.

5) Corneal contact lenses are the most common and, in general, most satisfactory. They are held on the corneal surface by capillary attraction and a differential pressure gradient on the anterior and posterior lens surface. At high altitude when ambient pressure is decreased (i.e., 1/4 atmosphere at about 32,000 feet) it is conceivable that the lens may easily disengage from the cornea and fall off.

6) Photophobia is somewhat of a problem to all new contact lens wearers and some never completely suppress this exaggerated symptom which could make the extreme brillance sometimes encountered in flight a real problem.

7) Visual acuity is decreased after removing contact lenses and is not immediately correctable with the ordinary spectacles for two reasons. The first is called "spectacle blur" and is due to small amounts of corneal edema, which usually will subside in about an hour after the lens is removed. The second is due to an actual remolding of the corneal surface by the contact lens (a change of the radius curvature of 0.05 mm will alter the refractive error by 1/4 diopter) and this may take about a week in longtime contact lens wearers to return to its original shape.

Since military professional aviators need 24 hour availability, it is felt by this writer that contact lenses are contraindicated. But in areas of private and commercial aviation they may serve the purpose quite well and be acceptable or even indicated.

-- Walter G. BULLINGTON
LCDR, MC, USNR

#

NEVER AGAIN

"I'm sorry to have to say this, but it appears that you will never be able to practice medicine again. I cannot say for sure, now; we must run further tests to evaluate your condition. However, I am not optimistic about the outcome."

If this statement were made to you, what would you think? How would you feel? All your training, all your aspirations, your whole future and that of your family, all in serious jeopardy. Certainly this would be a devastating experience, emotionally and professionally.

If you were required to take a physical exam each year with very "stiff" standards, and the continuance of your professional practice depended upon your passing the exam, how would you feel about it? Anticipating the possibility of such an outcome as just described, certainly you would be apprehensive and anxious. Even if you felt that you were in perfect shape, you would be anxious -- wondering if the EKG machine was impassively writing an unknown defect, or if that red blood (which seems a little bluer than you expected) has some unsuspected abnormality in it, or if those little "things" floating in your urine specimen, which you never noticed before, are abnormal, or if the doctor hears something abnormal when he lingers over your chest with the stethescope a little longer than usual. Under such circumstances, this annual physical exam would become, for most, a very threatening and traumatic experience. In fact, any confrontation with the individual who performs this exam would be considered with caution, and he would become a person best avoided at all times -- especially at any time when there actually might be something wrong!

The obvious parallel in real life to this hypothetical situation is the naval aviator, his flight surgeon and the annual physical exam. The degree of anxiety on the part of the aviator in most cases, is heightened even more by rumors and actual cases of pilots' being grounded because of seemingly insignificant problems such as PC>PD, marginal accommodation, slight B.P. elevation, defective hearing in an isolated frequency, mild hay fever, and the like. In actual practice, such suspicions are seldom based on fact, and flight surgeons in general try very hard to be fair and considerate of the aviators. But the fear and suspicion remain, to some degree, in the minds of most pilots, who, at the time of their exam are in anything but a natural or basal state. Furthermore, some aviators treat themselves or go to civilian doctors for the very problems on which the flight surgeon is an expert. Also, many minimize their symptoms, even to themselves, to the point that it is sometimes dangerous.

Safety Center records disclose that this avoidance or denial syndrome is particularly prevalent at the time when an aviator checks into a new squadron and reports to sick bay to get his up chit. Being unfamiliar with the new outfit, never having known the flight surgeon and being anxious to get started well in the operations department, he is quite inclined to avoid any problems in medical. Add to this the fact that many check-in physicals are actually performed by hospital corpsmen, the pilot never even being seen by a flight surgeon, and it is easy to see that many significant medical problems slip past at a time when it is very important that they be detected. Actual accidents have resulted because of this medical inattention to the physical condition of new pilots "just checking in."

Two problems, then, are seen to exist: First a frequent lack of real rapport and mutual confidence between the pilot and the flight surgeon, and second, a definite laxity on the part of some medical departments when checking in new pilots.

In reverse order, the solution to the check-in problem is for the flight surgeon to do his own work, actually seeing and evaluating the new pilot to determine his flight status, and to use this occasion to begin their acquaintance.

The solution to the problem of rapport and confidence is more involved, but not really difficult: The pilot needs the knowledge and ability of the flight surgeon, if he is to be a healthy, productive, and safe aviator, year after year. Nowhere else can he find a person with comparable insight and training. The Navy needs a trusting, honest relationship between pilot and flight surgeon in order to accomplish maximum, safe operational readiness and performance. Accomplishing both situations rests on the shoulders of the flight surgeon, himself, who must instill in his men the confidence and trust needed. If he is a seldom-seen, disinterested doctor who avoids dependents, writes an excessive number of down chits, and flies only for flight pay, pilots find it difficult to confide in him. However, if the flight surgeon shows a genuine interest in the pilot, his family, his operational demands, his career and his continuing good health, and if he very carefully considers each grounding notice, trying to make the pilot understand the reason why it is necessary, he will find an amazing thing. The pilot will quickly realize that the flight surgeon is "on his team," and he will confide in him and ask advice on many pertinent things which otherwise would never have come out. The pilot, likewise, will not be nearly so apprehensive about his annual physical exam, knowing that he can be truthful because the doctor is his ally. This fine professional relationship is a pleasure to be a part of and contributes very significantly to overall operational readiness and flight safety.

--- LCDR Robert McTAMMANY, MC, USN

#

MAG-12 NOTES FROM THE FLIGHT SURGEONS

The material reprinted below was sent in by LT A. J. HOFFMAN, MC, USNR, of MAG-12. The MAG-12 flight surgeons plan to publish their "Notes" locally on a monthly basis.

"Perhaps the medical officers who will soon begin duty with an Air Group in Southeast Asia may find it helpful to have a glimpse of the typical problems encountered and of our suggestions to the pilots for the solution of these problems," Dr. HOFFMAN says. "MAG-12 operates with the A-4 but the situations mentioned in our 'Notes' are pertinent to all fixed wing aircraft."

1. Morphine: As you know, two morphine syrettes are taped inside the individual Seek Kits. Let's review the basic rules for the use of morphine by non-medical personnel. In general, use morphine to relieve pain which is severe enough to hamper your ability to concentrate on the job at hand (e.g. evading the enemy). However, keep in mind the side effects of this potent drug: First, the type of morphine available here will not become effective for 30 to 40 minutes after injection, so don't use that second syrette for at least two hours after you have injected the first. Second, soon after injection, morphine causes blurring of vision and loss of accommodation. Third, morphine causes dizziness. Because of these last two effects, morphine is not to be injected while you are flying.

2. Survival Equipment in the Cockpit: Very soon, two new items will appear in the cockpits. They are: an ammonia ampule and a medium-size battle dressing. The ammonia should be used without hesitation...(when you have been wounded and) you feel weak, dizzy, or drowsy (due to the shock of the injury.) Simply crush the ampule between the thumb and forefinger, lift your oxygen mask from the bottom, and take a few whiffs of the ammonia. The battle dressing, which will be taped in a position where it can be reached with either hand, is to be used as a direct pressure dressing to stop bleeding. The use of tourniquets in the cockpit has been thoroughly investigated, and they have been found to be far inferior to direct pressure dressings in every respect.

Before leaving the discussion of medical self-aid gear found in the cockpit, we want to make clear our advice on an important point. That is, beware of the inherent danger of overconfidence in your ability to administer self-aid and still control the aircraft when you are wounded. Although you will have had a few whiffs of ammonia and will have slowed down the bleeding with a pressure dressing, you will be able to do nothing to prevent the onset of the shock reaction which naturally follows any injury. And once you lapse into the shock state, you'll probably lose consciousness which means you won't be able to either control the aircraft or eject. So, those few minutes between the time you are wounded and the time you go into shock are crucial. The conclusion is obvious. If you have sustained a wound resulting in moderate to severe pain and/or moderate to severe bleeding . . .(if you feel that you are about to lose consciousness, and if the area below is favorable for a rescue, go ahead and eject while still able to do so.)

3. Salt Tablets: As the days get hotter, you will be increasingly susceptible to the heat exhaustion symptoms of weakness, nausea, muscle cramps, and unconsciousness. The onset of this condition during a hop could be disastrous. To offset this possibility, we recommend that you take a salt tablet and a drink of water just before putting on your flight gear. Make this part of your preflight routine.

4. Survival Food: Finally, we pass on to you a suggestion gleaned from Captain "Hoss" Hornbsy (VMA 223). He points out that those flat, round cans of peanut butter, cheese, and jam which are found in "C" rations are excellent sources of highly concentrated food which can be easily stored in the flight suit and/or survival vest. We agree with "Hoss."

THE MAG-12 FLIGHT SURGEONS,
Mark Congress
Dave Fringer
Arnie Hoffman
Warren Patterson

#

MISCELLANY

1. We would like to receive MAG-12's Flight Surgeons' Notes every month as well as any similar material from flight surgeons in other squadrons and groups so that we can reprint selected items for wider dissemination. Send your material to Code 44, U. S. Naval Aviation Safety Center, Naval Air Station, Norfolk, Va. 23511. A cover letter is not necessary although we'd like to hear from you.

#

FOR OFFICIAL USE ONLY

No. 9-66

Flight Surgeon's NEWSLETTER

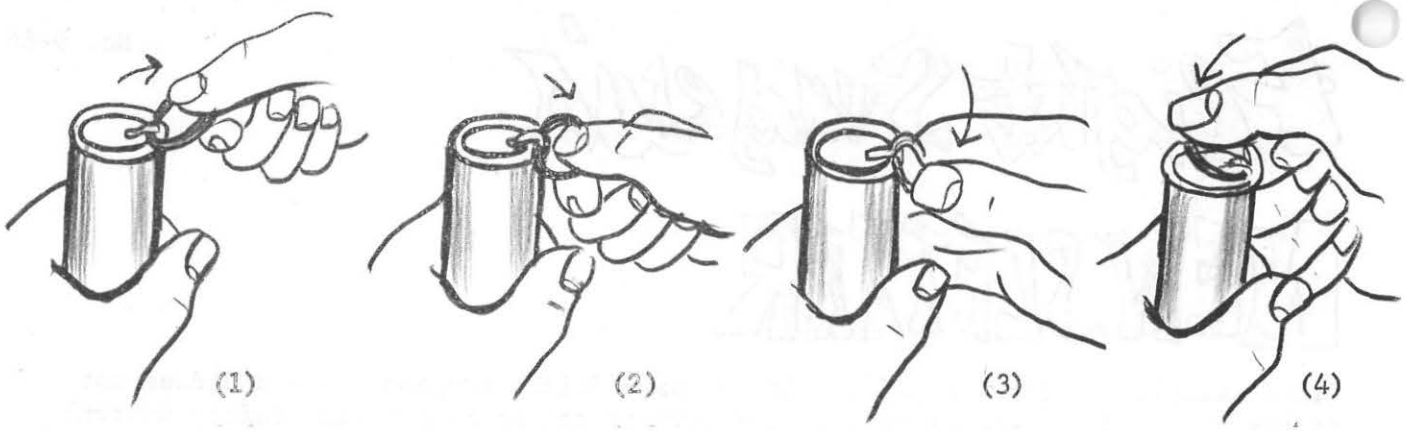
(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center).

NEW IGNITING METHOD FOR MK 13-0 DISTRESS SIGNALS

The old familiar Mk 13 Day and Night Distress Signal (now officially Marine Smoke and Illumination Signal, Mk 13 Mod 0) has been a trusted standby for many years as a "Here-I-Am, Please-Come-and-Get-Me" device for survivors on land or water. Recently, however, numerous complaints have been heard that, all too frequently, the igniting method as outlined on the signal body label doesn't work. Either the pull ring twists off entirely or the soldered seal simply refuses to separate. The end result - alarming if not slightly catastrophic to the would-be user - is that his call doesn't go through. The signals themselves are very effective once they are ignited. The difficulty seems to lie in trying to ignite them in accordance with the printed rules.

A new igniting method has recently been developed at the Naval Ammunition Depot, Crane, Ind., and has been incorporated in the First Revision of NAVWEPS OP 2213, Pyrotechnic, Screening, and Dye Marking Devices, as Change 1. In addition, appropriate steps have been taken to change the signal label to reflect this new method when new procurement of the Mk 13 becomes necessary. In the meantime, there are literally thousands of these signals in the system, and not too many persons will get a chance to see OP 2213.

This new igniting method rules out completely the igniting method as printed on the Mk 13 label. Tests have proved that the old recommended twisting force tears the pull ring off in too many cases and leaves you holding a signal that's not a signal because it can't be ignited. So don't twist the pull ring with your thumb and forefinger as it says on the can. Instead, bend it down over the rim of the signal body and then flip it back to its original position where the bend can be used as a lever to break the seal. Sounds simple, doesn't it? But it has been shown to be almost 100 percent reliable.



Step-by-step procedures for using the Mk 13 Signal are as follows:

1. Choose the end suitable for the signal needed - smoke for day, flame for night. (Incidentally, the night flame end is identified by raised humps or projections around the circumference of the case, approximately 1/4 inch from that end.)

2. Remove the paper (or plastic) cap or cover from the end to be used.

3. Grasp the pull ring and flip it over the rim of the signal case as shown in Sketch 1 above.

4. Press down on the overhanging ring with your thumb (Sketch 2) until the seal snaps, which it sometimes doesn't do. If the seal refuses to snap with this kind of force, continue pressing on ring so that it bends over the rim and against the signal body as shown in Sketch 3 above.

5. Flip the bent ring back to the top of the signal and press down (Sketch 4), using the bent pull ring as a lever.

6. After the seal breaks, point the signal away from your face and body and give a sharp yank on the pull ring. This will ignite the smoke or flame composition, whichever you chose to use.

7. Hold the signal at an angle of approximately 45 degrees from the horizontal with your arm fully extended. The angle will keep hot drippings from burning your hand.

8. After using one end, dunk the signal in the water to cool it and save the other end just in case you might need it later.

So that's it. The good old Mk 13 will do a good job for you if you don't twist its tail.

Prepared by: R. T. Frothingham, Research and Development Department, and M. Gilpatrick, Quality Evaluation Laboratory Department, U. S. Naval Ammunition Depot, Crane, Indiana

#

USE OF FULL PRESSURE SUIT IN FLIGHT

(The following account of the use of the full pressure suit under emergency conditions due to loss of cabin pressure at and above 45,000 feet was forwarded to the Safety Center by Commander, Naval Air Systems Command. The original report came from CDR Leroy B. Cochran, MSC, USN, Physiological Training Unit, MCAS, Cherry Point).

"Report subject: Loss of cabin pressurization in an F-4B aircraft during a training flight with the pilot and radar intercept officer wearing the Mk 4 full pressure suit.

"Background Information: In the interest of flight safety, most people involved in the full pressure suit program feel that no high altitude flight should ever be made without the use of the full pressure suit. Unfortunately, there are some who wish to take the calculated risk of not having a malfunction in the cabin pressurization system. In flight operations, utilizing the full pressure suit, data or case histories have been limited whereby it could be pointed out that personnel and/or aircraft have been protected. This episode which occured at this Marine Air Station serves as an example of the protection provided by the full pressure suit.

"Details of the in-flight incident (as told to this writer): On 3 June 1966 preparations were made for a full pressure suit high altitude training flight. After a thorough aircraft check-out the pilot made a normal take off and ascended to 39M feet. During the climb out, the programming of cabin pressurization functioned properly. At 39M feet, the pilot 'dumped' cabin pressurization in order to make an in-flight check of the full pressure suit and its related equipment. The suits became slightly pressurized and the pilot and RIO were satisfied and prepared to make a 'zoom' climb. After turning the pressurization switch to the 'on' position, the pilot nosed over slightly and attained a speed of 1.6 Mach indicated at 35M feet (cabin altitude prior to high altitude run is not known). At this point, approximately a 30 degree climb was initiated. As the aircraft was passing through 48M feet to 50M feet, the pressure suits became pressurized and the pilot observed the cabin altitude increasing. An abort maneuver was thus initiated. However, the aircraft attained a maximum altitude between 57M and 58M feet ambient, and the cabin altitude at this time was noted to be 53M feet. The full pressure suits, both the pilot's and RIO's, functioned perfectly, and the aircraft descended to a safe altitude and the flight was terminated. Needless to remark that these two men were very pleased and complimentary about the full pressure suit.

"Discussion: An attempt was made to determine the cause of the loss of cabin pressurization. The yellow sheets were reviewed for remarks made by the pilot and discrepancies corrected. It appears that the most likely cause was either a malfunction of the bellows which activates a proper canopy seal or perhaps a malfunction of the cabin pressurization regulator. In this aircraft the pressurization regulator is not protected from the possibility of some debris entering, thus prohibiting a proper closure or seal. The yellow sheet did show that an adjustment was made on the bellows and subsequent flights of the aircraft did not show any discrepancies in the pressurization system. The aircraft is now going through PAR and these systems will be thoroughly checked."

As of 1 July 1966 a permanent record is being maintained at the U. S. Naval Aviation Safety Center of incidents involving full pressure suits in flight. Inputs are requested, Code 424, Aero Medical Department, Naval Aviation Safety Center, Norfolk.

#

DEPTH PERCEPTION

The ability to perceive depth is a result of both monocular and binocular clues. The most refined and sophisticated process involved is stereopsis, a function of binocularity. In this phenomenon we interpret depth in relation to the object of regard by images of other objects in non-corresponding retinal points. For example, if a second object has a binasal representation in relation to the object of regard it will be interpreted as farther away, and by the same token bitemporal representation is interpreted as closer. The area in which this second object can still be fused into a single image is called Pannums fusional area and when these limits are exceeded, physiologic diplopia develops. This whole process is possible due to the simultaneous viewing of objects by two eyes at slightly different angles and fusion of these slightly dissimilar images. With the average eyes only 6.5 cm apart, the visual axes are parallel for all practical purposes when viewing objects greater than 20 feet away. Therefore stereopsis is of practically no benefit at distances greater than 20 feet and probably the most important depth perception clue for objects within arms' length.

The monocular clues that help us determine depth in space are size of image (both in relation to images of other objects seen simultaneously and previously learned normal object size), shadows cast by the object, haziness of image as seen in the far distance, superimposition of one object in front of another, converging lines into the distance as those of a railroad track, and parallax. These signs are most important to the normal binocular person for his far distant depth perception, but in monocular individuals can become increasingly more reliable clues at close distance.

-- Walter G. BULLINGTON
LCDR, MC, USNR

#

MISCELLANY

Recent record investigations at the Naval Aviation Safety Center have disclosed that equipment data put in MOR's is often incomplete, making the research more difficult. In particular:

1. There are several helmets in use now, with several types of fittings. These need to be described specifically so that equipment analysts will have the information necessary to evaluate the gear.

2. The same problem is more acute as it applies to ejection seats, modifications, lumbar pads, other pads and other variations. Again, it will be most helpful if more care is taken to detail these items of information in the MOR's.

#

ENCLOSURE 1

CADMIUM - CONTAINING SILVER SOLDER--POISONOUS

The following two articles regarding Cadmium-Containing Silver Solder were recently released.

* * * * * * * * *

Three "pneumonia" deaths have been traced to the use of cadmium-containing silver solder, U. S. Public Health Service sources say. The solder is commonly used in industry and in advanced home workshops.

No warning or public announcement has yet been decided upon at PHS, but officials fear the three cases are merely the first to be recognized-and that many other cadmium-caused deaths and illnesses are occurring.

It was learned that one death and a non-fatal illness were traced, by means of sophisticated medical detective work, to the silver solder in the area. The incidents grew in importance to PHS officials when the second and third fatalities were reported elsewhere.

A physician of the PHS Division of Occupational Health said that the industrial background of the fatality was almost overlooked.

One worker happened to have told his doctor he had been working with ammonia. (He had been, the day after using the solder.) This got the doctor looking into the patient's work and the cadmium-containing solder was noted. A test of tissues, after the patient's death, confirmed that cadmium had poisoned him.

Another physician of the PHS Division of Occupational Health said in an interview that there is concern the problem is more widespread than the three deaths and one illness might indicate.

Ordinary solder, made of tin and lead, melts easily and is useful for joining some metals, but silver solder is widely used for jewelry and for machinery that heats up.

In the three deaths, reports indicate the solder was used at high temperatures in a process called brazing. In one fatality, the worker was only exposed about three hours in a very large room. The non-fatal poisoning occurred out-of-doors with nine hours of exposure.

The product used was reported to have a minimal warning, "Contains cadmium. Emits dangerous fumes if overheated."

There is no federal control or supervision to assure that dangerous products used in industry are properly labeled for safety, one Public Health Service official noted.

The entire problem of cadmium-containing silver solder is bound to receive continued scrutiny at PHS, partly because of a physician there, who believes he may have been poisoned by the material himself, when using it to repair brass fittings on his 27-foot cruiser on West River. Immediately afterward, he fell ill. He didn't think of the solder as possible cause until later, when he had recovered from his respiratory trouble and the reports from other areas crossed his desk.

Now he uses his own case to illustrate how easily a poisoning and an ordinary illness can be confused - and to explain why PHS cannot estimate just how widespread the silver solder poisoning problem may be.

* * * * * * *

The U. S. Public Health Service has officially reported that inadequate federal requirements for labeling hazardous industrial materials helped bring about the death of a worker using cadmium-containing silver solder.

In statements being mailed to medical journals and trade and labor publications, the Public Health Service said that part of the problem resulting in one death, was that there are few federal requirements for properly labeling hazardous substances used in industry.

The silver solder, according to a report by the PHS small Division of Occupational Health, bore only a 1-1/4 by 2 inch loose, removable tag that said: "Contains cadmium, emits dangerous fumes if overheated."

The report sent by the Public Health Service to medical journals requested that physicians report further suspected cases to health officials for investigation.

It is noted that the first symptoms of the poisoning are often an irritation of the throat at the time of exposure followed by soreness in the chest.

In the report sent to labor and trade journals, the PHS warned that to avoid further poisonings workers must avoid breathing fumes emitted from heated silver solder, whether it contains cadmium or not, and that work areas must be supplied with proper ventilation, preferably with an exhaust system where the solder is being used.

Officials of the Division of Occupational Health grew concerned about silver solder when it was linked to deaths in three areas.

- - National Safety Council Safety Newsletter
July 1966 (Air Transport Section)

Enclosure 1
to FSNL 9-66

ENCLOSURE 2

CRASH BACKPACK

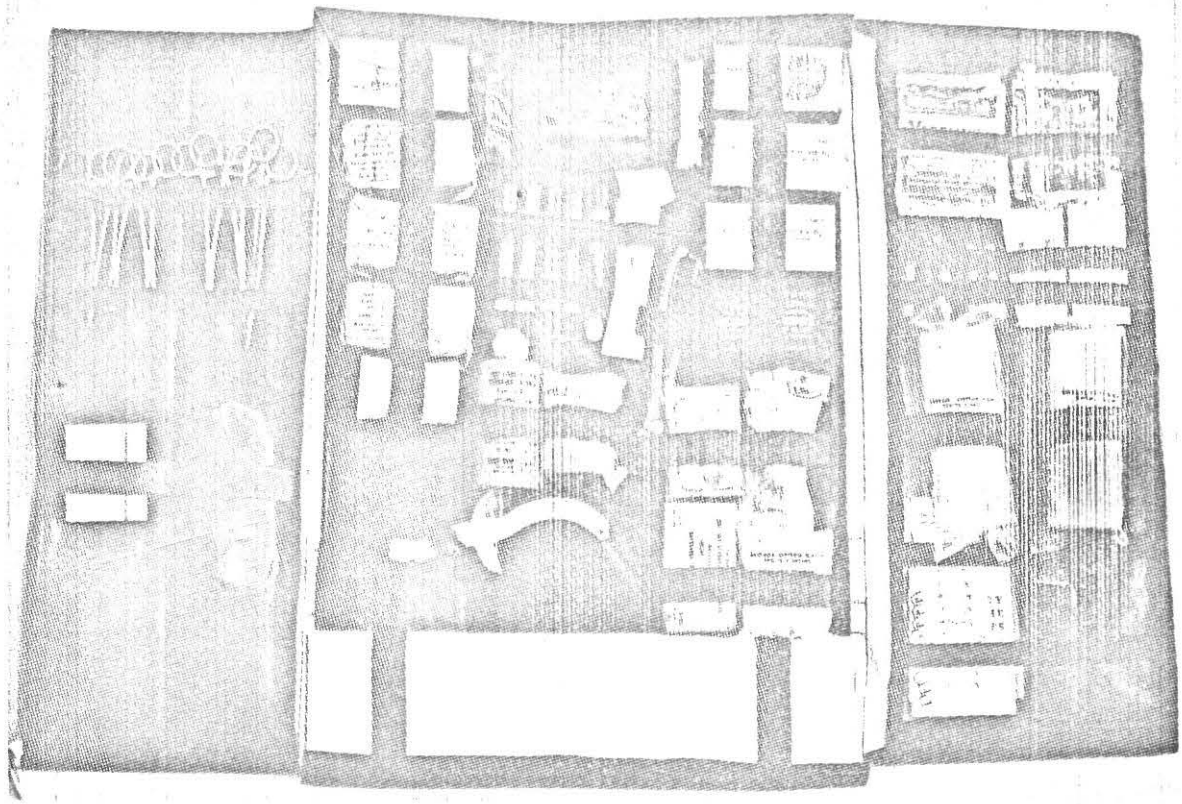
The accompanying photos (see next page) are of a crash backpack fabricated by SGT C. G. Ambrose, USMC, and LT J. E. Downing, MC, USNR of MCAS, Cherry Point. Dr. Downing, now a resident in ophthalmology at the U. S. Naval Hospital, Philadelphia, writes:

"Our crash backpack has several advantages over the traditional doctor's bag. Because both hands are left free while wearing it, it is handier trekking through the brush or riding up and down a helo rescue seat. It unzips and the flaps fold back so that emergency gear is only one layer deep and can easily be found. We pack only equipment likely to be needed for acute care; the loaded pack weighs less than 10 pounds.

The pistol belt holds a canteen on one side and a canvas bag containing a liter of saline with I.V. set on the other. A flashlight would be another handy item to carry on the belt.

The unit is kept in our crash ambulance and can easily be put on enroute to the flight line. We don't keep a doctor on the flight line but answer crash or other emergency calls from the hospital in a special 'crash ambulance' equipped with UHF."

Enclosure 2
PSUR 9-69



FOR OFFICIAL USE ONLY

No. 10-66

Flight Surgeon's NEWSLETTER

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center).

WHEN ARE BLOOD STUDIES REQUIRED IN AIRCRAFT ACCIDENT INVESTIGATION?

It has been pointed out in a recent MOR that some flight surgeons are unclear about what blood studies are required on survivors of aircraft accidents. There are no specific requirements as such, the matter being left to the judgment of the investigating flight surgeon. In "clear-cut" accidents, such as those due to material failure, where physiological factors are of no conceivable importance, it is reasonable to omit the procurement of such studies. However, in accidents in which the cause is not clear or pilot error accidents, good investigative judgment would require obtaining blood samples (and in fatal accidents, tissue specimens) for carbon monoxide, alcohol, or any other biochemical or toxicologic studies which might shed light on the cause factors.

#

FROSTBITE REPORT

The flight surgeon of VMFA-531 at MCAS, Cherry Point, LT John T. BONNER, sent us this report:

An unusual type of frostbite occurred on a cross-country hop which may be of interest to Newsletter readers. An F-4 pilot had placed his cigarette lighter in his flight suit pocket, under the anti-G suit. During climb to altitude, the lighter fluid evaporated at an increased rate due to the decreased pressure that was normally present in a pressurized cabin. The cabin altitude in this situation was about 7500 ft but the rapid evaporation carried away enough body heat to cause a small area of frostbite and local sloughing of a superficial layer of skin.

Volatile liquids evaporate faster in decreased atmospheric pressure. A cigarette lighter in a partial vacuum leaks easily and provides the situation for a nice burn if it comes in contact with the skin.

#

SUNGLASSES

For a sunglass to be effective under ordinary circumstances, the incident light must be attenuated by about 80%. The G-15 lens is designed so that when made in an ordinary thickness of ~~0.2 millimicrons~~ 2 mm it will transmit 19% of the incident light and filter out 81%.

In choosing the color of the lens to use, one must consider other factors. The neutral or smoke gray lens transmits rays of all hues of the visible spectrum in very close to equal proportions. Therefore, if the primary interest in sunglasses is light attenuation without color vision distortion, this lens would be an excellent choice. The green lens used by many sunglass manufacturers transmits rays primarily in the 510 millimicrons wavelength (green hue). Their reasoning for this was that in subdued light (scotopic vision) the rods were more sensitive to stimulation in this wavelength and this is true, but in subdued light there is no need for sunglasses in the first place and there is color vision distortion. The yellow lenses are used primarily to filter out blue light. It has a short wavelength and is scattered more by the prismatic effect of the droplets in fog, mist or clouds and produces a glare.

In prescription sunglasses ground from glass impregnated with pigment, one would note the concave lens (myopic correction) would have an area of rarefaction of pigment centrally and convex lens (hyperopic correction) would have an increase in pigment concentration centrally due to the alteration of thickness at this point. This ordinarily produces no problem in powers between the ranges of ± 3.5D. When the power required in the lens exceeds these limits it is wise to consider some form of uniform density lens of which there are two most common forms: 1) a spray coating on the lens of desired intensity and 2) fusion on the posterior surface of a plastic lamination impregnated with the proper pigmentation. There is an additional type of lens in which the pigmentation is not put in in a uniform fashion. This is the gradient density lens. When the pigmentation is placed in greater concentration in the top, then it can effectively filter intense light from above, such as the sun, yet still get adequate transmission for good visual discrimination of rays incident from the object of regard, which usually is on an equal horizontal plane with the eye. This is useful in high altitude flight and in areas of high intensity reflections from snow, etc., as in the Arctic and Antarctic.

WALTER G. BULLINGTON
LCDR, MC, USNR

#

OPHTHALMOLOGY CASE REPORT

An interesting ophthalmological condition was recently reported to the Safety Center in an MOR by Philip H. MOORE, LT, MC, USN, in the Training Command: Following a flame-out due to fuel exhaustion, a TF-9J pilot made a crash landing in a smooth pasture at an airspeed of 110 knots with the wings level in a nose high attitude. Impact forces were sufficiently strong to cause compression fractures of T-12, L-1 and L-2, as well as miscellaneous abrasions and contusions. There was a head motion to the left side causing helmet damage when it struck the aircraft. In the several days which followed, the pilot complained of visual difficulty and an ophthalmoscopic examination disclosed numerous scattered exudates and hemorrhages and a decreased visual acuity, in the left eye only.

One month earlier, on an annual physical exam, the retinal examination and visual acuity were carefully done, and no abnormalities were noted. There was no previous history of eye difficulty except for occasional tiring of the left eye when reading for long periods of time.

Following disclosure of this injury, further examination revealed two small scotomata in the same eye. All the abnormalities gradually resolved over a period of about one month and the pilot now (4 months later), has an essentially normal eye examination. His only symptom is, as before, mild eye fatigue with prolonged reading.

A number of knowledgeable people were queried about this case. None could recall a similar case or give it a name, except possibly the Brooke Army Hospital Eye Department in San Antonio, Texas where it was felt perhaps to be an example of the ophthalmic hydrostatic pressure syndrome. In any case, it appears to be an example of retinal vascular trauma due either to ground impact force or the helmeted head striking the side of the aircraft, or both.

The case is presented for general interest, to encourage flight surgeons to look for similar occurrences and report them in MOR's, and to invite comment from any one who might shed further light on the syndrome, its etiology, treatment and prognosis. We are anxious to publish any thoughts or comments we receive on this case.

#

HEARING LOSS REPORTED IN HELICOPTER PERSONNEL

It has come to the attention of the Safety Center that in at least one helo outfit, where the medical department is very active in searching out problem areas, there is hearing loss among pilots, crewmen and line personnel significantly greater than that seen in other aviation outfits. The feeling of the

flight surgeon is that the helo is not considered by the men to be as noisy or otherwise hazardous as fixed-wing birds. Consequently, safety programs are hard to keep going and this damage to hearing has resulted.

A word to all flight surgeons -- industrial safety and aviation safety are never-ending responsibilities and must be constantly pushed if they are to be effective. Those of you in helo outfits -- look around and see if the shoe fits. If you do find the same problem, let us know in the Center so we can get more emphasis out on it.

#

ENCLOSURE 1

SOME FACTS ON ALCOHOL

Drinking is a controversial and emotional subject. A physician seldom makes friends by telling patients what they should not do. However, veterans have been reported to have a higher incidence of alcoholism than non-veterans. The charge has been made that heavy drinking is one of the customs and traditions of military life. "Official military social functions, at which attendance is mandatory, invariably involve a cocktail party."[1] The following is presented for your consideration.

What is alcohol?

Ethyl alcohol -- drinking alcohol -- is a colorless, tasteless, nearly odorless liquid, usually produced by the fermentation of sugar solutions from plant material.

The word, alcohol, is derived from the Arabic word, "alkohl," which meant a very fine powder of antimony for coloring the eyelids. When a happy drinker designates his liquor as an "eyewash," his is almost speaking literally.[2] Fermentation stops at about 14% alcohol concentration. Therefore, all but the light wines are concentrated by distilling. Of interest to the weight-watchers will be the fact that one gram of alcohol contains seven calories, as compared to four calories per gram of sugar or protein, and nine calories for fat. Often a great many calories are consumed this way unknowingly.

Alcohol is very rapidly absorbed from the stomach and small intestine. It reaches its peak in the blood in 10-30 minutes. Drinking milk or eating fatty foods slows its absorption; water, on the other hand, facilitates absorption. The alcohol enters the various body tissues in concentrations which are directly and constantly related to that in the blood. Elimination of alcohol is chiefly by oxidative metabolism - like sugar - and less than 2% is lost through the lungs, skin, and kidneys. In contradistinction from fats, sugars, and proteins, alcohol cannot be stored in the body; it just circulates until metabolized.

The effect on the brain of alcohol is depression. Alcohol is never a stimulant. First to be depressed are the inhibitory centers. There is a shedding of social inhibitions. Elemental behavior comes out of hiding. Speech becomes loud and slurred. Mechanical functions dependent on conditioned reflexes are not performed well. Thinking, analyzing, and integrating are all done poorly. In larger quantities, the depression extends to the vital centers in the medulla. Alcohol kills by respiratory depression. Alcohol is not indicated as a stimulant whenever someone collapses. Further, as a depressant, alcohol can potentiate the actions of other depressant drugs. Alcohol is never a stimulant!

Incidentally, alcohol is not an aphrodisiac. This fact was recorded as far back as the 16th century by Shakespeare in Macbeth: "It provokes the desire,

Enclosure (1) to
FSNL 10-66

but it takes away the performance." In other words, moral barriers and inhibitions are broken; religious teachings and marital obligations assume less significance under the influence of the drug.

A useful function of alcohol for people with vascular insufficiency concerns its ability to dilate peripheral blood vessels. You may have experienced this effect by a feeling of warmth on the skin and reddening of the cheeks. It follows that alcohol should not be given to a person who will be subjected to the cold, so that the blood is not further chilled.

Small amounts of alcohol will reduce tensions and increase acid secretion from the stomach. Too much alcohol is definitely injurious to the lining of the digestive tract, and chronic gastroenteritis may result. A distinctive symptom in alcoholics is morning nausea and vomiting, or "dry heaves." This occurs on arising, is provoked by food or smoking, and subsides after 1 or 2 drinks. The incidence of peptic ulcer is exceptionally high in the alcoholic population.[3] Bleeding from the stomach region can be due to hard vomiting, ulcer, or rupture of dilated veins in the esophagus secondary to liver disease.

The excessive intake of alcohol and the concomitant state of semistarvation (remember, alcohol acts as a substitute for food calories, and there are no vitamins in alcoholic beverages) bring about, in a few months, an enlargement of the liver due to infiltration with fat. It has been shown that a single intoxicating dose of alcohol given to a normal person causes an increase in liver fat in 4-6 hours, maximal in 12-18 hours; in patients recovering from an alcoholic spree, a single small dose of alcohol causes an abrupt rise in blood enzyme levels usually indicative of liver damage.[2] If the drinker persists in his alcoholic and poor dietary habits, cirrhosis (scarring) of the liver will develop, and may be accompanied by grave complications: bleeding into the intestinal tract, coma, jaundice, and demasculinization of males. The pancreas can be injured by alcohol, causing abdominal pain, vomiting, poor digestion, and possible diabetes.

The chronic use of alcohol causes certain nutritional diseases of the central nervous system, and various forms of withdrawal symptoms after a short period of abstinence. These include alcoholic tremors or "shakes;" hallucinations of vision or hearing; alcoholic epilepsy or "rum fits;" and delirium tremens, the "DT's." DT's are fatal in 15% of the cases.

What is alcoholism?

Thus far, only the effects of alcohol as a chemical on the physical structures of the body have been discussed. One may be an alcoholic and not have any noticeable evidence of the diseases mentioned.

An alcoholic is defined as one whose dependence on alcohol has attained such a degree that it interferes with his health, his interpersonal relations, or his social or economic position. If this definition is alarming, the only reply is that alcoholism attacks without regard to either ability or social status.

There are over 70 million social drinkers in this country.[2] Alcoholism affects about 5 million people, and is the fourth most common disease in the United States.

The average young person in this country starts experimenting with drinking at age 17. There are tastes now and then of alcoholic beverages, and trial runs with a little beer, wine, or sip of a cocktail. The olive from a parent's martini may already be a ritual.[4] In one study of 2,000 high school students, 92% had tasted alcoholic beverages, and 23% continued to drink at least occasionally, but only 1% reported frequent drinking. In another study of 500 boys committed for observation by the courts, over 32% were classified as moderate drinkers, 12% as heavy drinkers, and 10% as problem drinkers. Their average age was 16 years.

The high school students emphasized sociability as motivation for drinking (e.g., to be sociable, to celebrate a special occasion), or they emphasized self-fulfillment (e.g., pleasant relaxation, or to enhance their concept of themselves as grown-up). On the other hand, the problem drinkers drank as a reaction to personal problems (e.g., when I am sad, when I feel angry, to get high). These indicate a personal need and desire for the effects of alcohol.

Drinking is a favorite social custom. One physician has said, "Boozing is the new national pastime."[5] Now, why do people drink? Fundamentally, alcohol changes the mood of one's personality. It produces a euphoria and increased <u>confidence</u> in one's own mental and physical powers. Inhibitions are overcome. A feeling of well being is created; self esteem is boosted. Conflicts and worries are forgotten, and life as a whole appears brighter. That is the reason people drink.[6] In other words, alcohol, like dope or tranquilizers or barbiturates, provides <u>an escape from the realities of daily living</u>.

For this reason, there is no sharp dividing line between the normal and abnormal drinker. But remembering that triad of health, work, and home, alcoholics can be further defined as reactive or addicted.[7] The reactive alcoholics have had relatively normal pre-alcoholic personality structures, and overuse alcohol when temporarily overwhelmed by some external stress. The alcohol addict has had difficulties in adjustments during his early years, and now has poor relationships within the family, school, work, and marriage. There has been no clearly defined point when loss of control over drinking occurred, and minimal observable external stress at the onset of a drinking episode. The need for drink has arisen from within the individual. The main feeling present in the alcohol addict is <u>depression</u>, and is responsible for his main defense mechanism of <u>denial</u> -- denial of his feelings of inferiority, depression, lack of self respect, and dependence on alcohol. "I can quit any time I want to."

<u>Recognizing the alcoholic</u>

The early identification of problem drinkers in any industry is difficult, but some common patterns emerge. Twenty per cent are in managerial or professional jobs, 35% in other supervisory positions, and 45% in non-supervisory

jobs. In one study of alcoholics under treatment, more than half reported seven or more years of problem drinking before any treatment was started -- a tremendous effort at hiding the problem to save the job. Of 44 on-the-job signs, the top ten were, in order of frequency: hangovers (84%), increased nervousness (83%), greater irritability (75%), putting things off (72%), red or bleary eyes (70%), spasmodic work pace, sensitivity to opinions about their own drinking, hand tremors, avoiding the boss or associates, and neglecting details. Tardiness, leaving work early, longer lunch periods, and, finally, absenteeism were low on the list. Absenteeism is a serious sign of problem drinking, and the greatest threat to job security. One may risk drinking before or during work when needed to avoid failing to appear for work.

Abstinence from alcohol essential for treatment

Treatment of the alcoholic is not for this discussion, but certain facts need emphasizing. Complete abstinence from alcohol is essential for the treatment of both the physical and the emotional aspects. Do not be guilty of telling an alcoholic, "Just one won't hurt you." An alcoholic must be extremely well motivated to stop drinking. Some have to "hit bottom" to finally recognize their plight. Finally, the family of an alcoholic may also need help.

You probably have at least one alcoholic somewhere in your organization. How to handle him is an individual problem. Do not accept less than standard work from him or make excuses for him. You might try to counsel him. Commanding officers can always refer him to the medical department.

Encouragement of drinking?

Alcoholic beverages are easily available ashore. Happy hour is encouraged. Many organizational social affairs do start with cocktail parties. Wine and beer make their appearance at noon, and some wives' club functions start with morning cocktails. While most people can control their drinking, some cannot. Perhaps these comments on alcohol and alcoholism will stimulate you to reappraise your personal drinking habits, and to gain some insight into the problems of your men.

Proverbs says, "Wine is a mocker, strong drink is raging; and whosoever is deceived thereby is not wise." "At the last it biteth like a serpent, and stingeth like an adder." Or in modern verse:

I drink to your health when we're together;
I drink to your health when I'm alone.
I drink to your health so often,
I've damn near ruined my own.

C. R. MOCK
LT, MC, USN

Enclosure (1) to
FSNL 10-66

References:

1. "Higher alcoholism rate found among veterans," U. S. Medicine, 1 June 1965.

2. Quarterly Journal of Studies on Alcohol, Supplement No. 1, 1961, pp. 5, 11, 57-65, 93-100, 101-106, 129, 130.

3. Harrison, T. R., et al, Principles of Internal Medicine, McGraw - Hill Book Co., New York, 1958.

4. Maryland Review on Alcoholism, Vol. 9:2, November 1962.

5. Maryland and Delaware News, No. 1, 1963.

6. Kant, F., The Treatment of the Alcoholic, Charles C. Thomas, Springfield, 1954.

7. Quarterly Journal of Studies on Alcohol, Vol. 20, 1959, pp. 281-291.

8. Krantz and Carr, The Pharmacologic Principles of Medical Practice, Williams & Wilkins, Baltimore, 1958.

9. Maryland Review on Alcoholism, Vol. 7:4, March 1961.

10. Ibid, Vol. 8:3, January 1962.

11. Washington Area Alcoholism Review, Vol. 3:2, December 1964.

12. Ruprecht, A. L., "The Doctor's Responsibility to an Alcoholic," Postgraduate Medicine, July 1962.

#

Flight Surgeon's NEWSLETTER

FOR OFFICIAL USE ONLY

No. 11-66

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

PRESBYOPIA AND THE SERVICE GROUP I PILOT, A CASE IN POINT

(The following article was contributed by LT S.H. LIBIEN, MC, USN)

For approximately 2½ years, a 42-year-old, very experienced C-1A pilot had noticed that he had difficulty "reading small print at night." He described his problem as follows: "When I try to read FLIP (airways) charts or aircraft check-lists, I must hold the material to be read at increasing distances from my eyes! 'Though my arms are still long enough,' the cockpit lighting in the C-1A at night is such that at arm's length the intensity of light that reaches my eyes is insufficient for adequate vision."

Inevitably, one night enroute to a carrier, the weather changed from a clear, starlit night with 3-5 miles predicted visibility and 3,000 ft ceiling to mixture of snow and sleet, 500 ft of ceiling, ½ mile visibility and the invariably pitching deck. "If I could have read the published approach to an alternate field, I might have been persuaded to divert, maybe. Still I elected to continue on to the carrier. On final approach, our port landing gear indicated unsafe and a check revealed Zero hydraulic pressure so we couldn't activate our emergency gear extension. By now we had insufficient fuel to divert so we were forced to take the barrier." Luckily, surely due to the skill and experience of the pilot, the aircraft was brought safely aboard sustaining only minor damage to the port engine but with no personnel injuries.

On physical examination a few days after this incident, this pilot was able to accommodate to within the normal limits established by the Manual of the Medical Department. His other visual tests were also normal. Six months later, however, re-examination revealed that the pilot no longer was Service Group I qualified due to defective accommodation. He is now flying in Service Group II and his accommodation is easily correctible with a pair of "reading glasses" which he carries with him to correct his night and now day reading difficulties.

Two interesting questions come to mind:

1. Are the Manual of Medical Department accommodation standards too low? Presumably years and years of experience have resulted in the accommodation tables but the "proof is in the pudding."

2. Is cockpit lighting in the C-1A adequate at night? Even if this were not so, the pilot can use his night (red) flashlight to assist him.

We return then to the basic problem in this case, i.e., presbyopia. Here in a 42-year-old fully qualified aviator, the lack of accommodative eye-power combines with the increase in divergent light rays as the distance from the light source to the eye increases. At night this results in a lack of effective candle-power reaching and stimulating the retina of the eye and at least contributed to the chain of events previously described.

We believe, therefore, that flight surgeons should be reminded to recheck accommodation in the older Service Group I aviators (38 years old and above) every six months especially if their accommodative powers were borderline at their last annual physical.

#

MISCELLANY

It has been reported to the Safety Center by Captain Roger G. IRELAND, MC, USN, at the Naval Air Engineering Center that a subject (himself) experienced a lowering of his G-tolerance from a normal of approximately 6 G's to 2 G's while using a muscle relaxing medication, mephenesin. This drug is a central acting skeletal muscle relaxant which, it would appear, also has some effect upon the smooth muscle in blood vessel walls, through some central or peripheral effect. The implication for crewmen of high-performance aircraft is obvious and until there is better understanding about such effects, caution would require discontinuation of high-G flying during the use of this and other muscle relaxing drugs.

#

ENCLOSURE 1

WIND CHILL CHART

Everybody knows it feels colder than the thermometer indicates when the wind blows and accelerates body heat loss but most of us don't realize how great the cooling effect of wind can be. Carrier based or shore based, naval aviation personnel have a wind chill problem which is intensified in winter months and in cold water operations. A wind-swept flight deck or airfield can be a mighty frigid environment and men working under these conditions should wear warm clothing and take precautions against frostbite.

In response to requests, we are reprinting here the Army wind chill chart, TB MED 81/AFP 160-5, 3 November 1954. It appeared in the USN Medical Newsletter, Vol. 32, No. 12 and was reprinted in the January 1962 Approach. (Change 3 which became available to us after January 1962, reworded the last sentence in Instruction 5.)

For this table the unit of wind chill is defined as the amount of heat that would be lost in an hour from a square meter of exposed skin surface which has a normal temperature of 91.4°F. The figures in the table are approximate equivalents only and are not to be interpreted as absolute temperature equivalents. It should be further noted, Army Circular 40-27 states, that the term "wind chill" as used expresses only the rate of cooling which occurs in the exposed or inadequately protected flesh. Equivalent wind chill figures of +23°F., 0°F., or -40°F., even though they are below the freezing point of water (+32°F.), do not mean that all exposed flesh will freeze solid nor that even the surface will be frozen. Regardless of the wind speed, actual temperature readings above 32°F. will never result in freezing of exposed flesh. On the other hand, all unprotected flesh exposed to temperatures below +20°F., regardless of wind speed, may freeze. Exposure to temperatures below +50°F. and +20°F. may result in cold injury of a type less severe than actual freezing of tissues and referred to as chilblains, trench foot, or immersion foot. The lower the temperature, the greater the wind velocity and the longer the exposure time the greater is the chance of cold injury. Many additional factors may contribute to or detract from this type of injury, e.g., physical activity, protective clothing, warming shelters, ground moisture, sunlight, moisture in clothing and extent of fatigue.

Instructions for use of the table (zero humidity factor):

1. First obtain the temperature and wind velocity forecast data.

2. Locate the number at the top corresponding to the expected wind speed (or the number closest to this).

3. Read down this column until the number corresponding to the expected temperature (or the number closest to this) is reached.

4. From this point, follow across to the right on the same line until the last number is reached under the column marked zero (0) wind speed.

5. This is the equivalent temperature reading. Example: Weather information gives the expected temperature (at a given time, such as midnight) to be 35°F. and the expected wind speed (at the time, midnight) to be 20 miles per hour (mph). Locate the 20 mph column at the top, follow down this column to the number nearest to 35°F. The nearest number is 34°F. From this point, move all the way to the right on the same line and find the last number, which is -38°F. This means that with a temperature of 35°F. and a wind speed of 20 miles per hour, the rate of cooling of all exposed flesh is the same as at -38°F. with no wind.

WIND VELOCITY Miles per hour										
45	35	25	20	15	10	5	3	2	1	0
TEMPERATURE Degrees Fahrenheit										
90°	89.5°	89°	88.5°	88°	88.75°	87.5°	87°	86°	84.5°	83°
82	81	80.5	80	79.5	78	76	74	72.5	70	60
72	71	69.5	68	67	65	60	57	53.5	47.5	23
63	61	59	57	55	52	44.5	39	34.5	20	-11
51	49	47	45	42.5	38	28	18.5	11	0	-27
41	39	36	34	30.5	25	11	0	-9	-23.5	-38
30	28	25	23	18	11	-5	-16.5	-40	Below -40	Below -40
20	18	14	11	6	-2	-19	-40	Below -40	"	"
10	7.5	3	0	-6	-15	-35	Below -40	"	"	"
0	-2.5	-8	-12	-18	-29	Below -40	"	"	"	"
-11	-14	-18	-23	-30	Below -40	"	"	"	"	"
-21	-24	-30	-35	Below -40	"	"	"	"	"	"
-32	-35	-40	-40	"	"	"	"	"	"	"

Enclosure ( ) to
FSNL 11-66

Flight Surgeon's NEWSLETTER

FOR OFFICIAL USE ONLY

No. 12-66

(This material is for the information of Navy flight surgeons only and does not necessarily reflect endorsement by the Navy or the Naval Aviation Safety Center.)

CASE REPORT: RETINITIS PIGMENTOSA

The following article was sent in by LCDR H. E. ALLSHOUSE, MC, USN, of the staff of the Station Hospital, NAS, Quonset Point, Rhode Island:

This is an account of a young third class air controlman who was referred for medical evaluation by the operations department of his present duty station. It had been observed that he was having difficulty performing his duties in the control tower during the hours of darkness, specifically in that he was unable to visually spot unlighted aircraft.

This man stated that he had had night blindness for as long as he could remember. His Standard Form 89 on initial enlistment in December, 1964 contains under physician's summary the notation, "claims to have night blindness." He described both his mother and maternal aunt as having nyctalopia.

This man applied for air controlman school and was found to be physically qualified at a major NAS activity on the West Coast in March, 1965. He was given an annual physical examination and found physically qualified for an FAA class II medical certificate and for duty as an air controlman at a major NAS activity on the East Coast in March, 1966. On both of these examinations this man's visual acuity, accommodation, color vision, depth perception, and phorias were recorded (correctly) as normal. His visual fields were also recorded as "normal."

During the current examination it was readily apparent on confrontation that this man had a contraction of his visual fields superiorly. This was confirmed by perimeter and tangent screen testing. He has subsequently stated that he had been unaware of the impairment of his peripheral vision. Night vision training performance was very poor. An ophthalmology consultation was obtained. Funduscopic findings were described as consistent with a diagnosis of retinitis pigmentosa.

It is indeed a sad commentary that two examining flight surgeons at far removed NAS activities did not detect an obvious finding of contracted visual fields, which had undoubtedly existed for quite some time. It is also unfortunate that

no attention was given by medical or other personnel to this man's claim to 'night blindness" prior to his training and subsequent assignment as an air controlman. It is desirable that all health record entries be reviewed in the selection of candidates for special training in order to save the time and expense of training a man for a job for which he is not physically qualified.

Editor's note: Every time you sign a "normal" SF-88 you have stated that the examined person has normal visual fields, intraocular tension, ocular motility, pupillary reactions, retinae -- as well as such other items as a normal neurologic examination, a normal psychiatric examination, a normal abdominal exam, normal lymphatics and many more. Neither ethical nor moral considerations in our profession allow for gross errors of commission or omission. How complete have your examinations been? What does your signature on the examination form really mean?

#

HYPOXIA AND PERFORMANCE DECREMENT ABSTRACT

Federal Aviation Agency, Office of Aviation Medicine, Civil Aeromedical Institute, Oklahoma City, Oklahoma. HYPOXIA AND PERFORMANCE DECREMENT by William F. O'Connor, Ph. D., Jim Scow, M.D., and George Pendergrass, Capt., USAF. May 1966, 5 pp. Report No. AM 66-15.

The concept of "time of useful consciousness" fails to take into account the progressive decay that occurs in performance under hypoxic conditions. This study, using a means of quantitatively assessing such a decrement, presents data obtained in a series of chamber runs at 27,500 and 35,000 feet. The performance-decrement functions appear to follow the arterial-oxygen-saturation curves.

#

LET'S KEEP IN CONTACT

Many of the senior flight surgeons in the Navy surely remember a publication put out by the School of Aviation Medicine in the 1950's entitled Contact. One of the very popular sections of this magazine was "Let's Keep in Contact," a section within which the senior medical officer from each U. S. Navy aviation command told about his facility and the activities of his assigned flight surgeons.

The staff of the "Flight Surgeon's Newsletter" has decided to resurrect this interesting and informative practice from the literary past and carry it on in the "Newsletter."

There are about 150 activities to which are assigned the approximately 500 naval flight surgeons on flying status. It is planned that each month a letter will be sent to one-twelfth of the senior medical officers within each of these commands, requesting information for publication. In this manner, news of each command will be reported every year, and all the flight surgeons will be afforded the opportunity of keeping in much closer touch with their colleagues all over the world.

It is anticipated that the program will again be of great interest to the participants, and it is being organized in such a way as to make it self-perpetuating. The success, however, will depend on your cooperation and suggestions for improvement which are solicited.

#

ENCLOSURE 1

SEARCH AND RESCUE OPERATIONS, ROYAL NAVY AIR STATION LOSSIEMOUTH, SCOTLAND (HMS FULMAR)

(The following article was sent us by LCDR J. W. WENGENT, MC, USN, VR-1, NATC, Patuxent River. Dr. WENGENT writes, "This SAR operation is of direct concern to U. S. naval units operating into Holly Loch, North Sea Fleet exercise and aircraft using Scottish Fields. This writer was able to spend several days observing routine helicopter sea drills and can attest to the smooth quick response of the SAR team. In spite of a smaller Navy with perhaps equipment not as plentiful, the British maintain, as usual, a highly skilled professional body of naval flight personnel." Dr. WENGENT's article should be of general interest to all concerned directly or indirectly in rescue and survival work.)

Present Royal Navy SAR work encompasses duties both of our traditional SAR missions plus work usually assigned to our Coast Guard. It may further include such diverse jobs as dropping hay and grain in winter-isolated Scotland, dropping chemicals on forest fires and the hunting of sheep-killing dogs. The SAR aircrew at "Lossie" are all career men. Officers and enlisted have trained together for a considerable period of time. These techniques show high professional standards of long term teamwork.

Standard rescue procedures for a survivor down at sea call for the dropping from a helicopter of a specially trained aircrew diver. These enlisted specialists receive eight weeks training in diving technique at the Royal Naval Diving School in Portland, England, then receive helicopter aircrew training. The Scuba equipment used is a Normalair Corporation Single Tank with reinforced chest strap and plate and a reinforced solid face piece mask. The air tank has a 25 minute capacity. Training starts on a diving board and progresses to a 40-foot tower. Standard helicopter drill calls for the drop to be less than 25 feet at 5 knots. In some special situations, drops of up to 40 feet have been accomplished. A significant injury rate has been noted above 40 feet.

The basic rule of thumb is that a SAR diver can be dropped into any sea state in which a helicopter recovery can be effected.

The SAR divers are required to maintain a high training standard. At least 10 helicopter dives are carried out each month. In actual practice many more are made. In addition, a minimum requirement of 120 minutes underwater in each four month period exists. Much practice is also given to freeing a dummy from a fouled parachute.

As noted, the tendency is that with the slightest hint of trouble the SAR diver will go into the water. The rescue is effected by the use of a strap with a cinch device or with a special double harness arrangement.

The diver's equipment consists of a two piece wet suit often individually modified by the diver in summer or a dry suit comparable to our Mark IV in winter, rubber hood, light modified Mae West (Mark V L.S.W.), knife, weights, rubber mittens, swim fins and the Normalair tank with solid face piece.

The diver reaching the survivor faces him and helps to support him until the sling is lowered. Two types of slings are used. A simple single lift strap but with a cinch that can be slid down the strap even with a frozen hand and a special double lift harness. Often the SAR diver will wear the double lift harness when he goes into the water.

The double lift harness closely resembles a parachute harness with a round quick release inertia box on the abdomen. A strap with two rings leads from the inertia box. The diver faces the survivor, passes a lowered single lift strap around the survivor, cinches it down and then attaches both himself and the survivor to the cable grip. With the diver's legs and arms lashed around the survivor, both are raised together.

The helicopter in use is the Westland Whirlwind, Mark VII. This bird has a 50 mile range at 75 knots' cruise, 90 knots' dash capability. It is extremely maneuverable. Commands to move 3 feet forward or 5 feet to the left, etc., are common. British SAR technique uses extreme attitudes and very flexible maneuvers at very low altitudes. (This writer did not feel that any of the crew were likely to get nose bleeds.) Emergency fuel dumps are scattered throughout Scotland and nearby islands, greatly facilitating range.

The disadvantage of the present SAR Helicopter is its moderate lift capability. Normal sea emergency launch crew consists of a pilot, medical officer (if the emergency is more than 5 miles at sea), aircrewman and SAR diver. Lift capacity is normally two survivors in addition to the crew or less in no wind, high temperature condition. Due to this problem, on occasion the SAR diver is left at the survival site. A common practice is the dropping of an inflatable dinghy and a long-burning smoke as soon as the SAR diver goes into the water in anticipation of a poor lift condition.

The scoop net technique (Sproule Net) previously used by the British has been nearly abandoned and is used only to retrieve wreckage and bodies. Crewmen spoken to were rather universal in stating that the scoop net technique to fish up live survivors was dangerous, a particular problem being skipping of the net and poor directional control in any real sea state.

RNAS Lossiemouth is able to launch its helicopter within three minutes during daylight flight operations. When flight operations are secured, a phone guard with about an actual one-half hour launch capability is maintained, although regulations call for a two hour launch time. The standby helicopter is on 15 minutes' notice during normal working hours.

Further intensive training is conducted in maintaining visual contact with the SAR diver in the water. This is a primary responsibility of the aircrewman who will also always light off and drop a marine smoke marker the minute the diver enters the water. The aircrewman assists the pilot with directional commands while hovering and maintains communications with the SAR diver by a very sophisticated system of hand signals. The diver can also be recalled by dropping a small thunderflash into the water. The helicopter is maneuverable enough to respond to a command of "Diver gone, go left three feet" from the aircrewman to the pilot; this latter is a standard procedure.

It is of interest to note that with the SAR responsibility for all of northern Scotland, Shetland and Orkney Islands and adjacent North Sea areas that waterproof illustrated survival instructions in five languages are carried. Much SAR business occurs with foreign fishing trawlers.

Practice using this SAR diver technique by all Royal Navy Flying personnel is consistent. All flying personnel must undergo a "wet dinghy drill" every three months. The open sea is used as often as feasible. Pilots and NFO's expressed a great deal of confidence in the ability of their SAR personnel to "fish them out." The SAR diver program was universally praised.

RNAS Lossiemouth is soon to obtain the Mark IX Westland Whirlwind. This is a jet turbine helicopter with approximately double the present range and lift capacity.

#

Enclosure 1
to FSNL 12-66

Royal Naval Official Photograph

Side view fully equippped SAR diver with Normalair diving set, Mk-5 "life saving waistcoat," diver's belt and weights, fins, knife and hood, plus dry suit.

Royal Naval Official Photograph

Rescue position for aircrewman in double lift harness facing survivor in rescue strap. Aircrewman's legs usually are locked about survivor.